



APPENDIX 4-3

**CONSTRUCTION AND
ENVIRONMENTAL
MANAGEMENT PLAN**

Construction and Environmental Management Plan

Slievegrine Renewable
Energy Development, Co.
Waterford



1. INTRODUCTION

This Environmental Impact Assessment Report (EIAR) has been prepared by MKO on behalf of the applicant, Slievegrine Ltd. who intends to apply to An Coimisiún Pleanála (ACP) for planning permission to construct a renewable energy development comprising 23 no. wind turbines, and associated infrastructure in the townland of Lyre and adjacent townlands, near Dungarvan in Co. Waterford. The application also includes for the connection of the proposed renewable energy development to the national grid, which proposes to connect into the existing Knockraha-Cullenagh 220kV overhead line, located in the townland of Ballycullane.

Section 1.1.1 of Chapter 1: *'Introduction to the Proposed Project'* of this EIAR provides a definition of the various project references used throughout the document. The 'Proposed Project', which encompasses the 'Proposed Wind Farm' and 'Proposed Grid Connection' has been assessed within this EIAR. The Proposed Project is located within the EIAR Site Boundary or the 'Site' which measures approximately 1,450 hectares (ha).

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

Triggers for amendments to the CEMP will include:

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

This CEMP identifies the key planning and environmental considerations that must be adhered to and delivered during site construction and operation. The construction 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 CEMP is presented as a guidance document for the construction of the Proposed Project.

The Proposed Project is located within the EIAR Site Boundary or the 'Site' which measures approximately 1,450 hectares (ha).

A detailed description of the Proposed Project is provided in Chapter 4: *'Description of the Proposed Project'* of the EIAR.

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

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

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

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

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

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

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

Section 7 consists of a summary table of all mitigation proposals to be adhered to during the Proposed Project, categorised into 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 and overburden;
- Ensure sustainable sources for materials supply where possible;
- Avoidance of any pollution incident or near miss as a result of working around or close to existing watercourses and having emergency measures in place;
- Avoidance of vandalism;
- 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 Proposed Site Location

The Site is made up of two distinct elements, the Proposed Wind Farm and the Proposed Grid Connection. The Site is located within a rural setting in southwest Waterford, approximately 5km southwest of Dungarvan, Co. Waterford. The village of Clashmore is located approximately 3.1km south of the Site.

The Proposed Grid Connection includes the Proposed 110kV Underground Cabling Route from the Proposed 110kV Substation, in the townland of Clashbrack, Co. Waterford, to the Proposed 220kV Loop-in Substation in the townland of Ballycullane, Co. Waterford. The Proposed 110kV Underground Cabling Route measures approximately 9km in length and is located primarily within the curtilage of the public road corridor with two sections (approximately 262m and 788m) being located within private lands.

The Site measures approximately 1,450 hectares and comprises a mix of agri-pastoral land and commercial forestry. The N25 national primary road runs in a north to south direction to the east of the Site, passing within 200m of the Site at its closest extent. The L-2024 local road traverses the northern section of the Proposed Wind Farm in an east- west direction, with the L-6085 local road bisecting the eastern portion of the Site. The L-2023 also bisects the central section of the Site. The Site is also served by a number of existing agricultural roads and tracks. Existing site access is via forestry and agricultural entrances off the L-2023 and L-2024 local roads, as well as the L-6084 local road to the south of the Site and the L-6082 to the west of the Site. The Grid Reference co-ordinates for the approximate centre of the Site are X 619562, Y 587416 (ITM).

Current land-use on the Proposed Wind Farm is predominantly comprised of a mix of commercial forestry and pastoral agriculture. Current land-use along the Proposed Grid Connection comprises of public road corridor and private land principally used by agriculture. The surrounding land use is predominantly pastoral agriculture, commercial forestry and low-density residential use along local and regional roads.

The Site is located within an area designated in the Waterford City and County Development Plan (WCCDP) 2022-2028 as a 'Preferred Area' for wind energy development. Please refer to Section 2.5.5 of Chapter 2: 'Background to the Proposed Project' for further detail.

2.2 Description of the Proposed Project

A detailed description of the Proposed Project is provided in Chapter 4: 'Description of the Proposed Project' of this EIAR. A brief description of the Proposed Project is provided below:

The full description of the Proposed Project, as per the public planning notices, is as follows:

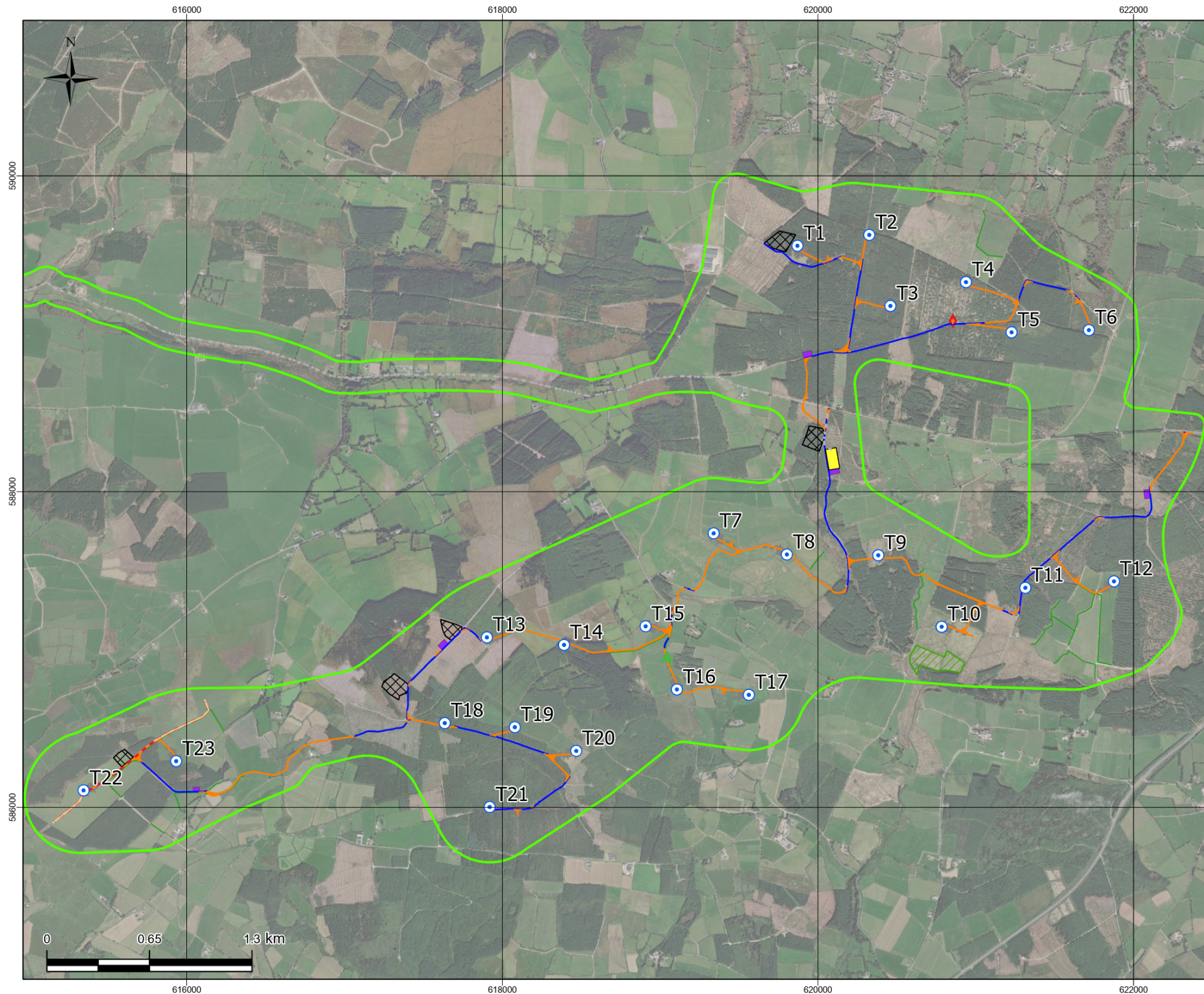
The proposed development will consist of the provision of the following:

- i. 23 no. wind turbines of varying dimensions, a meteorological mast and a telecommunications relay mast as follows:*
 - a. 6 no. wind turbines with an overall turbine tip height of 185 metres, a rotor blade diameter of 162 metres, and turbine hub height of 104 metres;*
 - b. 15 no. wind turbines with an overall turbine tip height of 175 metres, a rotor blade diameter of 150 metres, and turbine hub height of 100 metres;*
 - c. 2 no. wind turbines with an overall turbine tip height of 170 metres, a rotor blade diameter of 150 metres, and turbine hub height of 95 metres;*

- d. A meteorological mast with a height of 80 metres and a telecommunications relay mast with a height of 30m;*
- ii. Associated wind turbines, meteorological mast and telecommunications relay mast foundations and hardstanding areas;*
- iii. A 220kV loop-in substation compound (Including control buildings (with a combined floor area of 644Sq.m) with welfare facilities, all associated electrical plant and apparatus, security fencing, underground cabling, lightning protection poles and underground wastewater holding tank), with 220kV underground cabling connecting to 2 no. lattice-type end masts with a height of 21.5 metres to facilitate a 'Loop-in' connection to the existing 220kV Knockraha-Cullenagh overhead electricity transmission line, establishment of screening planting, all within the townland of Ballycullane;*
- iv. A 110kV substation compound (Including control buildings (with a combined floor area of 644Sq.m) with welfare facilities, all associated electrical plant and apparatus, security fencing, underground cabling, lightning protection poles and underground wastewater holding tank) in the townland of Clashbrack;*
- v. 110kV underground cabling connection from the proposed 110kV substation in the townland of Clashbrack to the proposed 220kV loop-in substation in the townland of Ballycullane, primarily located within the public road corridor (including joint bays, communication chambers, earth sheath links, and ancillary works along the cabling route);*
- vi. The re-routing underground of a section of the existing Dungarvan-Foxhole 38kV overhead line with 2 no. lattice-type end masts (15m height) and 38kV underground cabling (including joint bay) in the townlands of Cloghraun and Carronbeg;*
- vii. Underground electrical (33kV) and communications cabling connecting the wind turbines and meteorological mast to the proposed 110kV substation;*
- viii. 6 no. construction compounds (including temporary site offices and welfare facilities (with a combined floor area of 607.5 Sq.m));*
- ix. 4 no. security compounds (including temporary security cabins with a combined floor area of 72 Sq.m);*
- x. Junction accommodation works to facilitate access to the site, including the provision of new and upgrade of existing entrances and junctions off the L2024, L2021, L2023, L99997 and L6082 local roads, including new permanent gated site entrances;*
- xi. Upgrade of existing site tracks/roads and provision of new site access roads, junctions and hardstand areas (including upgrade of a short section of the L99997 local road);*
- xii. 5 no. borrow pits;*
- xiii. Spoil Management;*
- xiv. Biodiversity Management and Enhancement Plan measures (including establishment of a riparian planting, broadleaf woodland planting and hedgerow planting/enhancement);*
- xv. Tree felling and vegetation removal;*
- xvi. Site Drainage;*
- xvii. Operational stage site signage; and*
- xviii. All ancillary site development works and apparatus.*

The application is seeking a 10-year planning permission. Current and future wind turbine generator technology will ensure that the wind turbine model, chosen for the Proposed Project, will have an operational lifespan greater than the 35-year operational life that is being sought as part of the planning application.

The Proposed Wind Farm layout is shown in Figure 2-1. The Proposed Grid Connection layout is illustrated on Figure 2-2. Figure 2-3 illustrates the overall layout of the Proposed Project (i.e. the Proposed Wind Farm and Proposed Grid Connection together). Detailed site layout drawings of the Proposed Project are included in Appendix 4-1 to the EIAR.



Map Legend

- EIAR Site Boundary
- Proposed Project**
 - Proposed Turbine Locations
 - Proposed Hardstands
 - Proposed Met Mast
 - Proposed New Roads
 - Proposed Borrow pits
 - Construction Compounds
 - Proposed Telecommunications Relay Mast
 - Upgrades to Existing Roads
 - Proposed 38kV Cable Track
 - Proposed 38kV OHL Interface End Masts
 - Proposed 38kV Underground Cable
 - Proposed 110kV Substation
 - Proposed Hedgerow Planting (5.5km)
 - Proposed Native Woodland Planting (3.6ha)
 - Proposed Grid Connection Infrastructure

Spatial Reference
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Datum: IRENET95
Projection: Transverse Mercator

EIAR Site Boundary - NOT TO SCALE

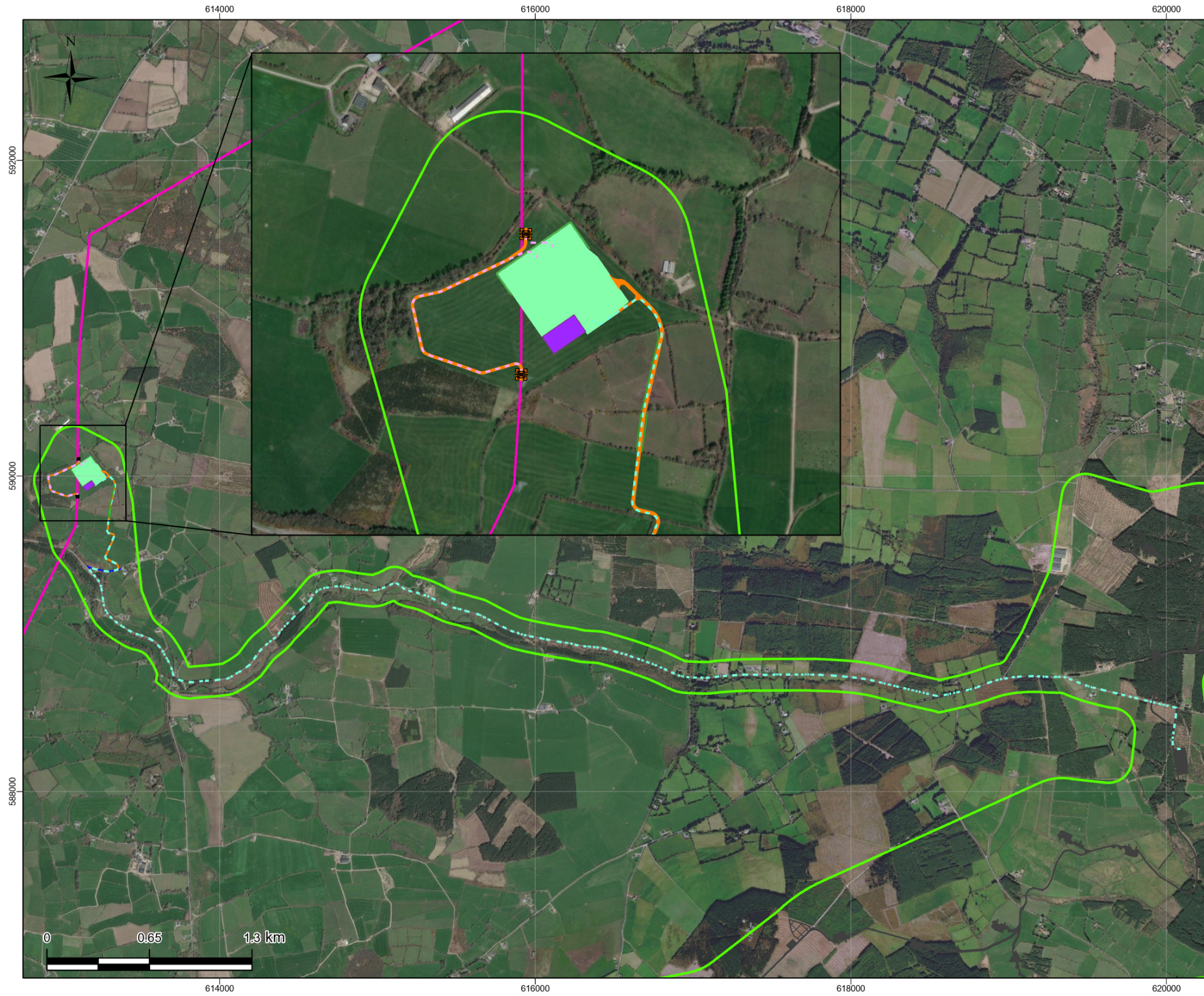
Proposed Wind Farm

Project Title: **Slievegrine Renewable Energy Development**

Project No.	Drawing No.	Scale
240740	2-1	1:22,000
Drawn By	Checked/By	Date
SOR	NS	01/10/2026

Email: info@mkofireland.ie Website: www.mkofireland.ie

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Map Legend

Proposed Project

- Proposed 220kV End Masts
- Proposed 220kV Loop-in Substation
- Proposed 220kV Underground Grid Connection Route
- Proposed 110kV Underground Cabling Route
- Upgrades to Existing Roads
- Proposed New Roads
- Construction Compounds
- Proposed Hedgerow Planting (5.5km)
- Proposed Screening Planting
- Proposed Wind Farm Infrastructure

Overhead Line

- Existing Knockraha-Cullenagh 220kV Overhead Line

Spatial Reference
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Datum: IRENET95
Projection: Transverse Mercator

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0 0.65 1.3 km

Proposed Grid Connection

Project Title:
Slievegrine Renewable Energy Development

Project No. 240740	Drawing No. 2-2	Scale 1:22,000
Drawn By SOR	Checked By NS	Date 25/09/2026

MKO

Email: info@mkofireland.ie Website: www.mkofireland.ie

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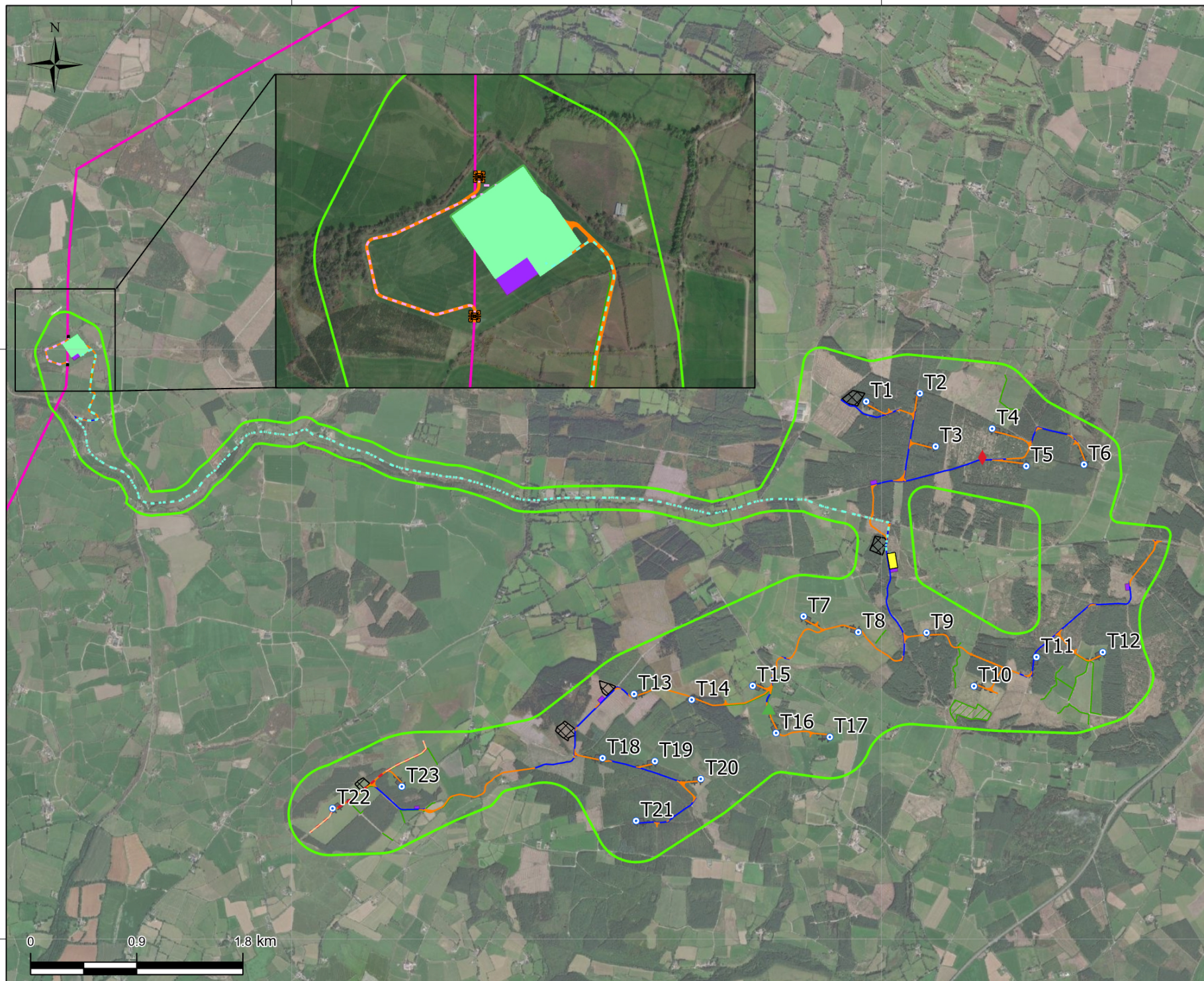
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EIAR Site Boundary

Proposed Project

- Proposed Turbine Locations
- Proposed Telecommunications Relay Mast
- Proposed Hardstands
- Proposed Met Mast
- Proposed New Roads
- Upgrades to Existing Roads
- Proposed Borrow pits
- Construction Compounds
- Proposed 38kV Cable Track
- Proposed 38kV OHL Interface End Masts
- Proposed 38kV Underground Cable
- Proposed 110kV Substation
- Proposed 110kV Underground Cabling Route
- Proposed 220kV End Masts
- Proposed 220kV Loop-in Substation
- Proposed 220kV Underground Grid Connection Route
- Proposed Hedgerow Planting (5.5km)
- Proposed Native Woodland Planting (3.6ha)
- Proposed Screening Planting

Overhead Line

- Existing Knockraha-Cullenagh 220kV Overhead Line

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator



EIAR Site Boundary - NOT TO SCALE

Drawing Title:

Proposed Project

Project Title:
Slievegrine Renewable Energy Development

Project No.	Drawing No.	Scale
240740	2-3	1:30,000
Drawn By	Checked By	Date
SOR	NS	06/10/2026



Email: info@mkofireland.ie/ Website: www.mkofireland.ie

2.3 Construction Management Practices 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 Management Practices is provided below.

2.3.2 Overview of Proposed Construction Management Practices

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

Proposed Wind Farm:

- Turbine Foundations & Meteorological/Telecommunications Mast Foundations;
- Site Roads and Hardstand Areas
 - New Site Access Road
 - Upgrading of Existing Site Access Road
- Underground Electrical (33kV) and Communication Cabling;
- Construction Compounds;
- Borrow Pits;
 - Rock Breaking
 - Blasting
- Spoil Management Practices;
- Clear Span Watercourse Crossing
- Bottomless Box Culvert Crossings
- 38kV Underground Electrical Cabling;
- 38kV Joint Bay;
- 38kV End Masts;
- Proposed 110kV Substation and Control Buildings
- Biodiversity Management and Enhancement Plan
 - New Hedgerow Establishment
 - Native Woodland Establishment

Proposed Grid Connection:

- Site Preparations;
- Trenching and Ducting;
- Proposed 110kV Underground Cabling Route ;
- 110kV Joint Bays;
- Proposed 220 kV Loop-in Substation and Control Buildings;

- 220kV Underground Electrical Cabling;
- 220kV End Masts;
- Screening Planting;
- Existing Underground Services;
- Construction Compound;
- Watercourse/Service Crossings;

2.3.3 Proposed Wind Farm

2.3.3.1 Turbine and Meteorological/Telecommunications Mast Foundations

Each wind turbine is secured to a reinforced concrete foundation that is installed below the finished ground level. 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 proposed horizontal and vertical extent of the turbine foundation will be 25m and 4m respectively, which has been assessed in the EIAR.

After the foundation level of each turbine has been formed using piling methods or 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.

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

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

Standard excavated reinforced concrete bases will be completed as follows:

1. *A layer of lean-mix blinding will be laid approximately 75mm thick directly on top of the newly exposed formation, tamped and finished with a screed board to leave a flat level surface. The concrete should be protected from rainfall during curing and all surface water runoff from the curing concrete should be prevented from entering surface water drainage directly;*
2. *High tensile steel reinforcement will be fixed around the anchor cage in accordance with the designer’s drawings & schedules. The foundation anchorage system will be installed, levelled and secured to the blinding using steel box section stools;*

3. *Ductwork will be installed as required, and formwork erected around the steel cage and propped from the backside as required;*
4. *The foundation anchorage system will be checked both for level and line prior to the concrete being installed in the base. These checks will be passed to turbine manufacturer for their approval;*
5. *Concrete will be placed using a concrete pump and compacted when in the forms using vibrating poker 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. *No excavated material will be removed from the Proposed Wind Farm site with excavated material being transported to the void borrow pits or linear berms within the Site.*

Reinforced concrete piled foundations will be completed as follows:

1. *The extent of the excavation will be marked out and will include an allowance for trimming the sides of the excavation to provide a safe working area and slope batter;*
2. *No excavated material will be removed from site with excavated spoil being transported and stored in the void borrow pits or linear berms within the Site.*
3. *Any 'Clay pan' material shall not be stockpiled within the Site and instead be transported straight to a void borrow pit for storage.*
4. *No material will be removed from site and placement areas will be stripped of vegetation prior to stockpiling in line with best working practices;*
5. *A piling platform for the piling rig will be constructed by excavating to a suitable intermediate mineral subsoil and backfilling to formation level by compacted layers of well graded granular material spread and compacted to provide a hard area for the piling rig;*
6. *The piling rig, fitted with an auger, will then bore through the soft material with a sleeve fitted around the auger to prevent the sidewalls of the soil and overburden from collapsing. The borehole is then extended to a suitable depth into the subsoil/bedrock.*
7. *When the auger and the sleeve are removed high tensile steel cages will be lowered into the boreholes. These steel cages will extrude above the level of the top of the concrete pile.*
8. *As the auger is removed concrete is pumped into the borehole.*
9. *Reinforcing steel on the top of the pile will tie to the foundation base steel.*
10. *The procedure for standard excavated reinforced concrete bases as outlined above can be applied from here.*

2.3.3.2 Site Roads and Hardstand Areas

Site roads will be constructed to each turbine base and at each base hard standing will be constructed to the turbine manufacturer's specifications. Tracked excavators will carry out excavation for roads with appropriate equipment attached. The excavations shall follow a logical route working away from the borrow pit locations. A 2-3m wide working area will be required around each hard standing area, with the sides of the excavated areas sloped sufficiently to ensure that slippage does not occur. Material excavated to create the working area will be stored locally for later reuse in backfilling the working area around the turbine foundation. The excavated material will be covered with polythene sheets or sealed with the excavator bucket and surrounded by silt fences to ensure sediment-laden run-off does not occur.

When the formation layer has been reached, stone from the on-site borrow pits shall be placed to form the road foundation. In the event of large clay deposits being encountered in sections of road, a geotextile layer will be required at sub base level. The sub grade will be compacted with the use of a roller. The final wearing course will not be provided until all bases have been poured. This prevents damage to the wearing course due to stone and concrete trucks movements. The road will be upgraded prior to the arrival of the first turbine. All roads will be maintained for the duration of the operation of the Proposed Project.

2.3.3.2.1 New Site Access Road

The construction methodology for the 13.5km of proposed new access roads across the Site and turbine hardstands is outlined as follows:

- Establish alignment of the new road from the construction drawings and mark out the centrelines with ranging rods or timber posts;
- All drainage measures prescribed in the detailed drainage design for the Proposed Project will be implemented around the works area;
- The road layout has been designed to avoid crossings of natural watercourses where possible;
- 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;
- The access tracks will be of single-track design with a width of 5m with localised widening at bends and changes in direction. (depending on the location within the Site)
- All spoil excavated will be managed on-site. It will be temporarily stockpiled within the Site for reuse for landscaping purposes. No spoil will be stockpiled in works areas adjacent to natural watercourses within stockpile exclusion zones as outlined in Figure 2-4 below.
- The subsoil will be excavated down to a suitable formation layer of competent stratum;
- The road will be constructed using well-graded granular fill (imported or site-won), spread and compacted in layers typically of 200mm and a suitable capping layer to provide a homogeneous running surface. The thickness of layers and amount of compaction required will be subject to detailed design by Project Engineer in consultation with the Construction Manager based on the characteristics of the material and the compaction plant to be used;
- The new access roads will be constructed with a camber to aid drainage of surface water;
- Excavations side slopes shall not generally be greater than 1(V): 2 (H). Design slopes will be informed by the Geotechnical Engineer;
- At bends or steep inclines from the road, reflective snow poles will be erected to warn traffic on dark mornings and evenings that there is a turn in the road or a sharp incline beyond the road.
- Where underground services are to be traversed during the construction of new roads throughout the Proposed Wind Farm site, they will be traversed as per the methodology as outlined above, as it is not anticipated that any existing services will be encountered when excavating the proposed new site access roads due to the nature of the works.

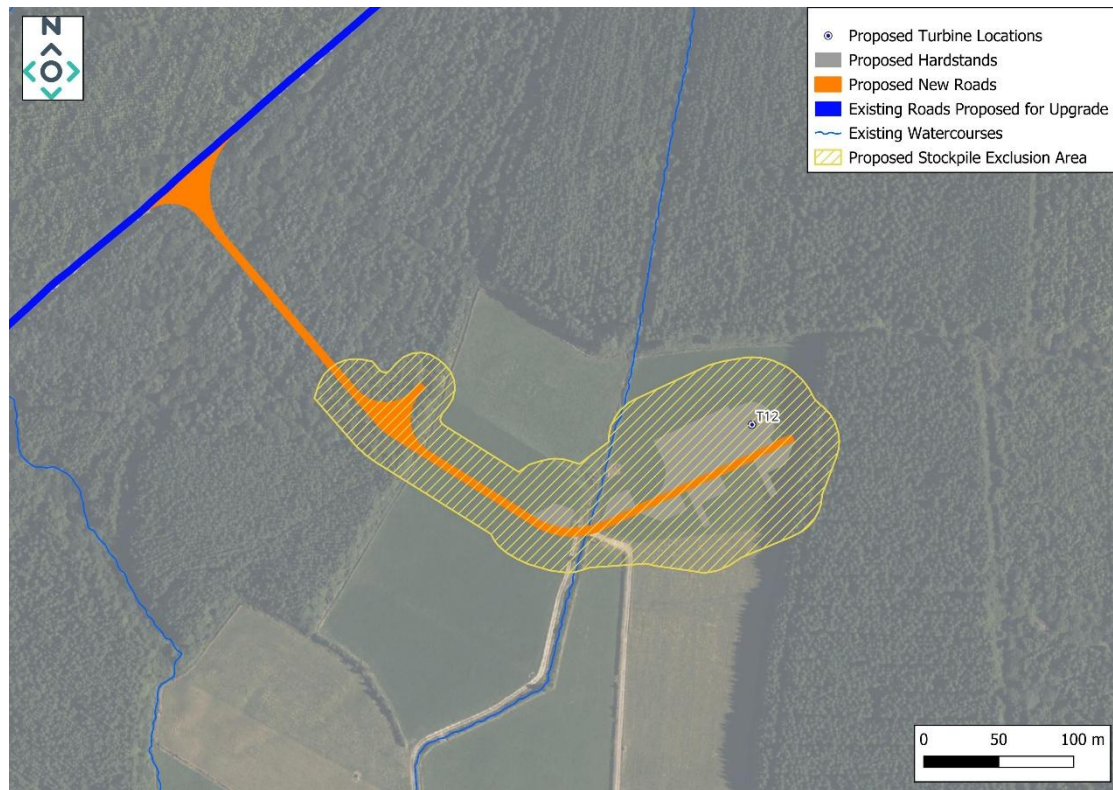


Figure 2-4 Stockpile Exclusion Areas within the Proposed Wind Farm site

2.3.3.2.2 Upgrading of Existing Site Access Road

Approximately 8.9km of the existing roads across the Site 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 the laying of a new surface dressing on the existing section of roadway where necessary. The road widening will be undertaken as follows:

- If it is considered that the current road formation level is adequate to support required bearing, then no upgrade or widening works will be completed.
- Otherwise, where required, the subsoil in the existing road verge will be excavated down to a suitable formation layer.
- All spoil excavated will be managed on-site. It will be temporarily stockpiled on Site and placed within the onsite borrow pit voids within the Proposed Wind Farm site. Some topsoil may be temporarily stockpiled locally for reuse for landscaping purposes.
- All drainage measures prescribed in the detailed drainage design for the Proposed Project will be implemented around the works area.
- Well-graded granular fill (imported or site-won) will be spread and compacted in layers up to 200mm to provide a homogeneous running surface. The thickness of layers and amount of compaction required will be decided by the Construction Manager based on the characteristics of the material and the compaction plant to be used.
- These layers of granular fill will be brought to the same level as the top of the existing road surface.
- Where required, a layer of geogrid will be installed directly onto the top of the granular fill layer and the existing road surface.
- A layer of finer well graded stone for the running surface will be laid on the geogrid and compacted.

- Upon completion the upgraded roads will be a single-track design with a width of 5m with localised widening at bends and changes in direction (depending on the location within the Site).
- Prior to any works commencing on the upgrade of existing roads, the requirement for additional roadside drainage will be considered by the Project Hydrologist in line with the proposals outlined in the CEMP.

2.3.3.3 **Underground Electrical (33kV) and Communication Cabling**

The transformer in each turbine and the met mast is connected to the Proposed 110kV Substation through a network of buried electrical and communication cabling. The ground is trenched using a mechanical excavator. The top layer of soil (or road surface) is removed and saved so that it is replaced on completion. The cables will be bedded with suitable material. The cables will be laid at a depth of approximately 1.2m below ground level; a suitable marking tape is installed between the cabling and the surface (see Plate 2-1 below illustrating an example of a single cable trench). On completion, the ground will be reinstated. The route of the underground electrical and communication cabling will follow the access tracks as illustrated on the planning drawings included as Appendix 4-1 of the EIAR. The cabling may be placed on either side of the road footprint, 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. Whilst not anticipated given no underground services within the Proposed Wind Farm site were discovered during scoping exercises with Gas Networks Ireland and Uisce Éireann, should any underground services be encountered along the internal wind farm IPP cabling route, they will be traversed using one of the methods outlined in Section 2.5.2.8 below.



Plate 2-1 Typical Single Cable Trench View



Plate 2-2 Typical Trefoil Cable Trench View

2.3.3.4 Construction Compounds

There are 6 no. proposed construction compounds located across the Site. The compounds will be constructed in the same manner 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 below in Section 2.3.3.13;
- A layer of geo-grid will be installed where deemed necessary by the designer and compacted layers of well graded granular material will be spread and lightly compacted to provide a hard area for Site offices and storage containers;
- A limited amount of fuel will have to be stored in appropriately bundled containers and a designated area for oil storage will be constructed within the compound.
- Areas within the compound will be constructed as site roads and used as vehicle hardstandings during deliveries and for parking;
- A bundled 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 Proposed Project, the construction compounds will be decommissioned and allowed to vegetate naturally.

2.3.3.5 Borrow Pits

The estimated volume to be extracted from the borrow pits for the construction of the Proposed Project is up to approximately 395,800 m³ (with a 10% contingency factor). This figure presented is the anticipated maximum volumes; however, the actual volumes to be removed from the borrow pit will be confirmed at the time of construction and following detailed pre-construction site investigation works. It is intended to obtain the majority of materials for the construction of the Proposed Project from the 5 no. proposed onsite borrow pits (engineer's specified material may be imported onto the Site should

sufficient volumes of suitable material not be encountered during the excavation phase of the proposed infrastructure, to be sourced from local, licenced quarries).

The borrow pits will be excavated and backfilled as follows:

- The area to be used for the borrow pit 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 initial borrow pit excavation will involve removal of soil to the top of bedrock. These materials will be stored temporarily in selected temporary stock pile areas or used for landscaping throughout the Site;
- All drainage measures prescribed in the detailed drainage design for the Proposed Project will be implemented around the works area;
- The bedrock material will be extracted by breaking and blasting (Section 2.3.3.5.1 and 2.3.3.5.2 below) from the borrow pit and stockpiled or used as required;
- The use of material won from the borrow pit will be sequential with new road construction or turbine foundation formations;
- Temporary stockpiling of aggregates will be required to accommodate the cut and fill operations within the borrow pit, and the progression of access roads and turbine excavations;
- As the borrow pit excavation progress and become deeper, surface water and groundwater ingress will be removed via pumping to settlement ponds, and re-distribution locally across natural vegetated areas. Where required, additional specialist water treatment measures will be employed to ensure no deterioration in downstream water quality occurs;
- The use of temporary access ramps and long reach excavators during the placement of the excavated spoil will be required.
- The surface of the placed spoil will be shaped to allow efficient run-off of surface water from the placed arising towards the perimeter of the borrow pit.
- An interceptor drain will also be installed around the perimeter of the borrow pit. This drain will divert any surface water away from the borrow pit and hence prevent water from ponding and lodging during construction and also when reinstated.
- Temporary control of groundwater within the borrow pits will be required and measures will be determined as part of the ground investigation programme. A temporary pump and suitable outfall locations will be required during construction.
- Settlement ponds have been designed at the lower side/outfall location of the borrow pits.
- Supervision by the Project Geotechnical Engineer is required for the development of the borrow pits.

Two extraction methods have been assessed for breaking out the useful rock below: rock breaking and blasting.

2.3.3.5.1 **Rock Breaking**

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

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

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

2.3.3.5.2 Rock Blasting

Where blasting is used as an extraction method, a mobile drilling rig is used to drill vertical boreholes into the area of rock that is to be blasted. A drilling rig will drill the necessary number of boreholes required for a single blast in approximately 3 to 4 days. The locations, depth and number of boreholes are determined by the blast engineer. This is a specialist role fulfilled by the blasting contractor.

The blast engineer will arrange for the necessary quantity of explosive to be brought to site to undertake a single blast. The management of explosives on-site and the actual blasting operation will be agreed in advance with and supervised by An Gardaí Sióchána. The blast engineer sets the explosives in place in the boreholes, sets the charges, and fires the blast. All residents within 2km of the blast site will be informed at least 24 hours prior to blasting taking place.

A properly designed blast should generate rock of a size that can be loaded directly into a mobile crusher, using the same wheeled loader outlined above. The same method is used for processing the rock generated from a blast, as would be used to process rock generated by rock breaking. Generally, the drilling rig will recommence drilling blast holes for the next blast as soon as one blast is finished. The potential impacts and control measures associated with noise and vibration from this extraction method are assessed in Chapter 12: 'Noise and Vibration'. Any blasting will be carried out in accordance with the *Guidance on the Safe Use of Explosives in Quarries* (Safety and Health Commission for the Mining and Other Extractive Industries, 2002)¹ and the British Standard BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Noise*².

2.3.3.6 Spoil Management Practices

The following recommendations and best practice guidelines for the placement of spoil for use in landscaping will be adhered to during the construction of the Proposed Project:

- The landscaping areas will be developed in a phased approach, with the spoil being removed and temporarily stockpiled within a defined area while the borrow pit is being extracted. The stockpiled spoil will be deposited into the void borrow pit upon completion of extraction activities and the exercise will continue within the void until it cannot accommodate any further spoil.
- Stockpiles of excavated spoil will not be placed within the stockpile exclusion areas, as outlined in Figure 4-4.
- The material will be backfilled into the void borrow pits and landscaping areas and will be spread evenly across the area.
- Stockpiles 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 areas.

¹https://www.hsa.ie/eng/Publications_and_Forms/Publications/Mines_and_Quarries/Guidance%20on%20the%20Safe%20Use%20of%20Explosives%20in%20Quarries.pdf

²<https://www.thenbs.com/PublicationIndex/documents/details?Pub=BSI&DocID=305965>

- 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.
- Inspections of the temporary stockpiles, reinstated borrow pits and landscaping areas will be made by a Geotechnical Engineer through regular monitoring of the works. The appointed contractor will review work practices at these areas when periods of heavy rainfall are expected so as to prevent excessive dirty water runoff from being generated.
- 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.

All the above-mentioned general guidelines and requirements will be confirmed by the Geotechnical Engineer prior to construction.

2.3.3.7 Clear-Span Bridge Watercourse Crossing

It is proposed to construct a clear-span watercourse crossing within the Proposed Wind Farm site. The locations of these crossings are shown on the layout drawings included in Appendix 4-1. The clear-span watercourse crossing methodology presented below will ensure that no instream works are necessary. The standard construction methodology for the installation of a clear-span watercourse crossing is as follows:

- The access road on the approach either side of the watercourse will be completed to a formation level which is suitable for the passing of plant and equipment required for the installation of each watercourse crossing.
- All drainage measures along the proposed road will be installed in advance of the works.
- A foundation base will be excavated to rock or competent ground with a mechanical excavator with the foundation formed in-situ using a semi-dry concrete lean mix. The base will be excavated along the stream bank with no instream works required.
- Access to the opposite side of the watercourse for excavation and foundation installation will require the installation of a temporary pre-cast concrete or metal bridge across the watercourse to provide temporary access for the excavator. Plant and equipment will not be permitted to track across the watercourse.
- Once the foundation base has been completed, the pre-cast concrete clear-span structure will be installed using a crane which will be set up on the bank of the watercourse and will be lifted into place from the bank with no contact with the watercourse.
- Where the bottomless box culvert is installed in sections, the joints will be sealed to prevent granular material entering the watercourse.
- Once the crossing is in position stone backfill will be placed and compacted against the structure up to the required level above the foundations.
- Underground cabling ducting will be contained within the road make-up of the proposed crossing.

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

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

2.3.3.8 Bottomless Box Culvert Crossings

Bottomless box culvert crossings will be required within the Proposed Wind Farm site. The locations of these crossings are shown on the layout drawings included in Appendix 4-1. The bottomless box culvert crossing methodology presented below will ensure that no instream works are necessary. The standard construction methodology for the installation of a bottomless box culvert crossing is as follows:

1. The access road on the approach either side of the watercourse will be completed to a formation level which is suitable for the passing of plant and equipment required for the installation of each watercourse crossing.
2. All drainage measures along the proposed road will be installed in advance of the works.
3. A foundation base will be excavated to rock or competent ground with a mechanical excavator with the foundation formed in-situ using a semi-dry concrete lean mix. The base will be excavated along the stream bank with no instream works required.
4. Access to the opposite side of the watercourse for excavation and foundation installation will require the installation of a temporary pre-cast concrete bridge across the watercourse to provide temporary access for the excavator. Plant and equipment will not be permitted to track across the watercourse.
5. Once the foundation base has been completed, the pre-cast bottomless culvert will be installed using a crane which will be set up on the bank of the watercourse and will be lifted into place from the bank with no contact with the watercourse.
6. Once the crossing is in position stone backfill will be placed and compacted against the structure up to the required level above the foundations.
7. Underground cabling ducting will be contained within the road make-up of the proposed crossing.

2.3.3.9 Culvert Crossing

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

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

All culverts will be inspected regularly to ensure they are not blocked by debris, vegetation or any other material that may impede conveyance.

2.3.3.10 38kV Underground Electrical Cabling

The 38kV underground electrical cabling works will consist of the installation of ducts in an excavated trench to accommodate electrical cables to facilitate the rerouting underground of the 1230m section of the existing Dungarvan-Foxhole OHL. Please see Appendix 4-1 of the EIAR for details.

The 38kV underground electrical cabling will be installed within new proposed access roads using the following methodology:

- Before works commence, updated surveying will take place along the proposed cable route, with all existing culverts and services identified. All relevant bodies i.e., ESNB, Waterford County Council etc. will be contacted and all up to date information for all existing services sought.
- A tracked 360-degree excavator will dig out the proposed trench, typically to a depth of 1.2m, within which the ducts will be laid.
- The cable ducts will be concrete surrounded.
- Trench supports will be installed, or the trench sides will be benched or battered back where appropriate and any ingress of ground water will be removed from the trench using submersible pumps, fitted with appropriate silt filtration systems, to prevent contamination of any watercourse.
- Once the trench has been excavated, a base-layer will be laid and compacted, comprising UGM Type A, or 15 Newton CBM4 concrete as required.
- The ducting will be installed as per specification, with couplers fitted and capped to prevent any dirt etc. entering the duct. In poor ground conditions, the ends of the ducts will be shimmed up from the bed of the trench, to prevent any possible ingress of water dirt. The shims will be removed again once the next length has been connected. Extreme care will be taken to ensure that all duct collars (both ends) are clean and in good condition prior to ducts being joined.
- As the works progress, the as-built location of the ducting will be recorded using a total station or GPS.
- As per the associated base-layer (UGM Type A material or 15 Newton CBM4 concrete) will be installed and compacted as per approved detail, with care not to displace the ducting.
- Spacers will be used to ensure that the correct cover is achieved at both sides of the ducting.
- The remainder of the trench will be backfilled in two compacted layers with approved engineer's specified material.
- Yellow marker warning tape will be installed across the width of the trench, at 300mm depth,
- The finished surface is to be reinstated, as per original specification. Off-road cabling may be finished with granular fill to facilitate access to the trench for any potential maintenance that is required.

Marker posts will then be placed to denote the location of the underground cabling

2.3.3.11 38kV Joint Bay

Joint bays are typically pre-cast concrete chambers where lengths of cable will be joined to form one continuous cable. A joint bay will be required at one location along the proposed 38kV underground cabling route. Joint Bays are typically 2.5m x 4.5m x 2m 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 jointing of the communication cabling. 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 electrical cabling, 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 proximity to Joint Bays. Earth Sheath Link Chambers and Communication Chambers will be pre-cast concrete structures with a steel access cover at finished surface level. The locations of the joint bays and chambers are shown on the Grid Connection Infrastructure drawings in Appendix 4-1.

The precise siting of all Joint Bays, Earth Sheath Link Chambers and Communication Chambers within the underground cabling route corridor assessed is subject to approval by ESB/EirGrid.

2.3.3.12 38kV End Masts

It is proposed to reroute underground the 38kV Dungarvan-Foxhole OHL. Two proposed 38kV end masts (lattice type towers) will be located immediately beneath the existing 38kV OHL. Please see Figure 2-1 for location details. The existing 38kV OHL conductor will be terminated at these end masts to facilitate the proposed underground section. The following section outlines the construction methodology for the new end masts structures which will be constructed underneath the existing 38kV OHL:

- The Steel lattice tower sites are scanned for underground services such as cables etc.
- A foundation c.6m x 6m is excavated and the formation levels (depths) will be checked by the on-site foreman. The excavated material will be temporarily stored close to the excavation.
- To aid construction, a concrete pipe is placed into each excavation to allow operatives level the end mast at the bottom of the excavation. The frame of the reinforcing bars will be prepared and strapped to a concrete pipe with spacers as required. The reinforcing bars will be lifted into each excavated foundation using the excavator and chains/slings. The base and body section of each tower will then be assembled next to excavation.
- Concrete trucks will pour concrete directly into each excavation in distinct stages.
- Once the main concrete foundation pour is cured after circa five days, metal shuttering is installed to accommodate the placement of concrete around the tower legs. During each pour, the concrete will be vibrated thoroughly using a vibrating poker.
- Once the concrete is set after the five days the shuttering is removed.
- The tower foundations will be backfilled one leg at a time with the material already excavated at the location. The backfill will be placed and compacted in layers. All dimensions will be checked following the backfilling process.
- The existing overhead line will be de-energised by ESB so work can commence on the construction of the towers.
- An earth mat consisting of copper or aluminium wire will be laid circa 400mm below ground around the tower. This earth mat is a requirement for the electrical connection of the equipment on the tower structure.
- Once the base section of each tower is completed and the concrete sufficiently cured, it is ready to receive the tower body. Temporary hardstands may be removed and disposed of off site where necessary.
- A hardstand area for the crane will be created by laying geogrid material on the ground surface and overlaying this geogrid with a suitable grade of aggregate.
- A physical barrier (Heras Fence Site Boundary) will be put in place to restrict plant from coming too close to the OHL.
- The towers will be constructed lying flat on the ground beside the recently installed tower base.
- The conductor will be moved off centre using a stay wire and weights to anchor the stay wire to ground.
- The tower section will be lifted into place using the crane and guide ropes.
- The body sections will be bolted into position.

- The conductor will be centred over the towers and held in place. Once the conductor is secured at both ends it is then cut and attached onto each tower. The small section of conductor in between the two towers will be removed and utilised as connector wire for the new towers.

2.3.3.13 Proposed 110kV Substation and Control Buildings

A detailed drawing of the Proposed 110kV Substation is shown in Appendix 4-1 of the EIAR. The Proposed 110kV Substation will be constructed using the following methodology:

- The area of the Proposed 110kV Substation will be marked out using ranging rods or wooden posts and the soil and overburden stripped and temporarily stockpiled for later use in landscaping. Any excess material will be temporarily stockpiled and stored within the void borrow pits in the Proposed Wind Farm site.
- 2 no. control buildings will be built within the Proposed 110kV Substation compound.
- The foundations will be excavated down to the level indicated by the designer and appropriately shuttered reinforced concrete will be laid over it. An anti-bleeding admixture will be included in the concrete mix.
- The block work walls will be built up from the footings to DPC level and the floor slab constructed, having first located any ducts or trenches required by the follow on mechanical and electrical contractors.
- The block work will then be raised to wall plate level and the gables & internal partition walls formed. Scaffold will be erected around the outside of the building for this operation.
- The roof slabs will be lifted into position using an adequately sized mobile crane.
- The timber roof trusses will then be lifted into position using a telescopic load all or mobile crane depending on-site conditions. The roof trusses will then be felted, battened, tiled and sealed against the weather.
- The transformer, electrical equipment, and storage container plinths 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.
- Lightning poles will be erected at appropriate locations adjacent to the substation. All lightning poles will be appropriately earthed.
- The electrical equipment will be installed and commissioned.
- Perimeter fencing will be erected.
- The construction and components of the Proposed 110kV Substation will be built to EirGrid specifications.

The construction and components of the Proposed 110kV Substation will be built to EirGrid specifications.

2.3.3.14 Biodiversity Management and Enhancement Plan

2.3.3.14.1 New Hedgerow Establishment

The potential for translocation of existing hedgerows requiring removal was considered. However, hedgerow condition assessments were undertaken in line with the Hedgerow Appraisal System, as outlined in Appendix 6-1. Following analysis, it was deemed that the conservation value of the existing hedgerows requiring removal was relatively low and therefore did not warrant translocation. Therefore, new hedgerow establishment is proposed. New hedgerow establishment is more likely to be successful than translocation in this instance, with the proposed establishment and monitoring protocol in place, and will result in a higher value hedgerow type, resulting in a net gain in hedgerow habitat within the Site.

It is proposed to plant 5.5km of new hedgerow within the Site. The proposed hedgerow replanting areas are depicted on Figure 2-1 and have been strategically chosen to link up areas where bat commuting activity has been recorded during the dedicated baseline surveys undertaken. The proposed new hedgerow includes approximately 1.2km of riparian hedgerow planting proposed alongside existing river corridors, in order to provide further benefits of excluding access to the watercourse by livestock, and by providing an additional vegetative buffer to slow down run-off from adjacent lands to the watercourses in these areas.

Species selected will be indigenous to the local area and will maximise flowering times throughout the year as well as berry availability later in the year. New hedgerows will be planted between November – March when the woody hedge plants are dormant. When planting new hedgerow, plants will be closely spaced (a maximum of 50cm apart) and planted in a staggered row. The new hedgerow will need to be protected from poaching by livestock, through the erection of new stockproof fencing where required, which will be at least 1m away from the hedge, and installed on each side if required.

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. Planting will use larger seedlings, transplants or cuttings (sizing as per the *BS 3936 - Nursery Stock - Part 1: Specification for trees and shrubs*³) to ensure connectivity gains are immediate and will be indigenous to the local area. Species to be used include hawthorn (*Crataegus monogyna*) which will make up approximately 75% of the hedgerow mix. The ideal native hedge is made up of 75% Hawthorn and 25% of at least 4 other species⁴, previously recorded on Site. This includes:

- Elder (*Sambucus nigra*)
- Blackthorn (*Prunus spinosa*)
- Grey willow (*Salix cinerea*)
- Rowan (*Sorbus aucuparia*)
- Privet (*Ligustrum vulgare*)

2.3.3.14.2 Maintenance of Newly Planted Hedgerows

In order to facilitate the successful establishment of new hedgerows to be planted, the following management measures are proposed (DAERA, 2022):

- New hedgerow shrub planting will be kept weed and litter free until the new plants are established, particularly from ruderal weeds. Healthy growth will be maintained by allowing the plant to occupy as much of the planting areas as possible to allow them to achieve as close their natural form as possible.
- When the plants are established, the ground flora will not be cut between March and October.
- During spring and autumn maintenance periods all trees and plants will be checked and adjusted/replaced as required, soil firmed, and any dead wood present removed back to healthy tissue and mulch added if required. Where tree guards are no longer required these will be removed to avoid damage to the tree.
- During the first growing season, all standard trees/ semi-mature trees will be watered regularly during any prolonged dry periods during the growing season (i.e. in April, May, June, July and August). During the second growing season the trees will be kept well-watered as often as required, particularly during June, July and August.
- Hedgerows will be trimmed every two – three years, with the cutting height raised 10-15cm each year, with trimming taking place in late winter (January / February), thus allowing flowers and fruit to develop.

³ British Standard. (1992). *BS 3936 - Nursery Stock - Part 1: Specification for trees and shrubs*.

⁴ NBDC. (2018). *All Ireland Pollinator Plan How-to-guide: Hedgerows for pollinators*. National Biodiversity Data Centre.

- Hedgerows can be trimmed to produce an 'A' Shaped hedgerow which allows more light into the base.
- Any tree, hedge or shrub that is removed, uprooted, destroyed or that becomes seriously damaged, defective diseased or dead shall be replaced in the same location with another plant of the same species and size as that originally planted. All such replacements shall be carried out within the first planting season following the loss.

2.3.3.14.3 Native Woodland Establishment

The Proposed Wind Farm site borders the Licky River, part of the Blackwater River (Cork/Waterford) SAC, to the south. This SAC supports a range of aquatic QI species and habitats which are highly dependent on the water quality of the river, in particular freshwater pearl mussel (*Margaritifera margaritifera*). In order to enhance the biodiversity value on Site and create an additional riparian buffer to contribute to the protection of the water quality of the Licky River, it is proposed to establish a new native woodland measuring 3.6ha in area. This woodland will include a riparian boundary along a tributary of the Licky River, measuring approx. 100m in length. The proposed planting area is located at the southern boundary of the Proposed Wind Farm site, south of the Proposed Turbine T10 (Figure 2-1). This location has been strategically sited in an area characterised by high surface water flows.

Woodland planting will follow the guidance laid out in "The Classification of Native Woodlands in Ireland and its Application to Native Woodland Management"⁵ (Cross et al. 2010) and "Native Riparian Woodlands – A Guide to Identification, Design, Establishment and Management"⁶ (Little et al. 2008).

Woodland Species

The existing habitat in the proposed woodland planting area is wet grassland (GS4). It is proposed that the woodland to be established will be of a species mix corresponding with a sub type of the *AF- Alder-meadowsweet* woodland type defined in (Cross et al. 2008, Plate 3-2 below). Tree species will include a primary species mix of pedunculate oak (*Quercus robur*), alder (*Alnus glutinosa*) and grey willow (*Salix cinerea*). It is likely that the woodland would conform most closely to the 'wet pedunculate oak-ash woodland (WN4) category (Fossitt 2000), as outlined in Appendix 1 of Cross et al. (2010). However, there will be no planting of ash due to biosecurity concerns associated with the potential for infection of trees by ash dieback (*Hymenoscyphus fraxineus*). Trees will be of native origin and will be of advanced nursery stock where possible. Additionally, the following measures will be applied when planting trees:

- Mark out the area for planting so it is clear exactly where planting will be established.
- Trees will not be evenly spaced and instead will be spaced out randomly to mimic natural plant spacing. They will be planted at lower planting densities in order to allow natural recolonisation by other native species, particularly shrubs.
- Newly planted trees will need to be protected from poaching by livestock, through the installation of new stockproof fencing which will be at least 2m away from the treeline, and on each side if required.

⁵ <https://www.woodlandsofireland.ie/wp-content/uploads/No.-6-Woodland-Classification.pdf>

⁶ <https://www.woodlandsofireland.ie/wp-content/uploads/No.-4-Riparian-Woodlands.pdf>

Table 2-1: A list of the appropriate tree and shrub species to plant in each riparian woodland sub-type. (Adapted from Cross et al. 2010). Please note however, that no planting of Ash is proposed

	Sessile oak	Birch	Rowan	Holly	Scots Pine	Ash	Hazel	Hawthorn	Pedunculate oak	Wild cherry	Crab apple	Alder	Grey willow	Spindle	Elm	Yew	White-beam	Purging buck-thorn	Goulden rose	Silver birch	Salix species
AF Alder-meadowsweet (<i>Alnus glutinosa</i> – <i>Filipendula ulmaria</i>) woodland type																					
AF1 Ash – remote sedge (<i>Fraxinus excelsior</i> – <i>Carex remota</i>) sub-type				(x)		x	(x)	x	(x)			x	x								
AF2 Alder – bramble (<i>Alnus glutinosa</i> – <i>Rubus fruticosus</i>) sub-type						(x)		x				x	x								
AF4 Hawthorn-herb-Robert (<i>Crataegus monogyna</i> – <i>Geranium robertianum</i>) sub-type						x		x				x									
AF5 Birch – water mint (<i>Betula pubescens</i> – <i>Mentha aquatica</i>) sub-type		x				x		(x)				x	x						(x)		
SU Almond willow-nettle (<i>Salix triandra</i> – <i>Urtica dioica</i>) sub-type												x	x								x

2.3.3.14.4

Maintenance of established Hedgerows and Woodland

In order to facilitate the successful establishment of the new trees to be planted within the Site, the following measures are proposed:

- During spring and autumn maintenance periods all trees and plants will be checked and adjusted/replaced as required, soil firmed and any dead wood present removed back to healthy tissue and mulch added if required. Where tree stakes and ties are no longer required these will be removed to avoid damage to the tree;
- During the first growing season, all standard trees/ semi-mature trees will be watered regularly during any prolonged dry periods during the growing season (i.e. in April, May, June, July and August), if required. During the second growing season the trees will be kept well-watered as often as required, particularly during June, July and August.
- Any tree, hedge or shrub that is removed, uprooted, destroyed or that becomes seriously damaged, defective diseased or dead shall be replaced in the same location with another plant of the same species and size as that which was originally planted. All such replacements shall be carried out within the first planting season following the loss.
- Replanted trees will be inspected following the main growing season (i.e. in September) for the first three years of growth, where the requirement for replacement planting will be assessed. If any trees are dead or damaged these will be replaced using the same species within the next planting season. Recommendations for ongoing or remedial management required will be specified within a periodic Monitoring Report.

2.3.3.15 Telecommunications Mast

Foundations

- Prior to commencement of Excavation works “dial before you dig” will be requested from the respected service providers
- Area scanned and where applicable services identified to ensure there is no services in the vicinity of the foundations
- Area around services will be Hand dug to expose services
- Foundation will be set out by surveyor as per construction drawings.

- Area excavated to Formation Level and material removed off site to permitted waste facility
- Subbase installed and compacted
- Formwork & Reinforcement installed as per steel schedule
- Tower Base Template Installed
- Holding down bolts installed
- Concrete design mix submitted for approval
- Pre-pour inspection completed and signed off
- Concrete pour commences and Concrete samples (cubes) taken.
- Concrete vibrated to ensure compaction
 - Concrete finished off as per design detail
 - Concrete results checked after 7 & 28 days
 - Installation of Service ducts

Erection methodology

- Tower Sections preassembled in yard and QA check completed
- Tower sections loaded on lorry for delivery to site.
- Crane base installed as required.
- A Site-Specific Lift Plan will be developed for the Installation of the Tower. Lift Plan will determine size and location of Crane.
- Site Rigging Team deployed to Site and the Person in Charge of the Works (PICW) will coordinate the installation of the tower.
- As per lift plan sections of Tower will be installed on the Foundation, once concrete has achieved optimum strength.
- Slinger / Signaller will guide sections in place
- Sections bolted together and torqued, and QA inspection completed
- Process continues until all sections are in place
- Access Ladder will be installed with each section and certified once installation is completed

Accessory mounting / climbing

- Certified Rigging Team with Climbing and rescue training will be appointed to carry out installation of equipment on Tower.
- PICW will coordinate the installation of accessories, Antennas, Cabling, Mounting brackets etc.
- A Hauling Plan will develop to install equipment
- A rope and pulley system will be used to lift the equipment in place.
- Mounting brackets and bolts will be installed following Antenna and associated equipment

Connection of services

- Where required the Contractor will engage with the relevant Services providers, including the utility providers such as ESB etc.
- For Power, if Required, the Contractor will submit relevant certification including Recertificate application
- Appropriate service ducting, chambers and units will be installed as per the relevant service providers specifications.

Tower Foundation/ Base

- backfill, compaction and site dressing as per specification
- no signs of erosion around tower base and foundations
- make good all non-structural damage to concrete
- ensure there is no standing water or erosion
- unblock/ fix weep holes
- non-shrink grouting correct thickness (at least 30mm)
- correct number of anchor bolt nuts
- anchor bolts torqued to correct specification
- anchor bolts protrusions correct. (2 threads minimum)
- tower legs properly bonded to ground ring
- grounding connections securely fastened

Tower Structure

- tower drawings available on site for acceptance
- all tower members present/ no missing members
- check member sizes/markings correlate with structural & construction report / BOM
- all connection/ backing plates present/ no missing plates
- all connector plates installed correctly
- all bolts and nuts installed/ no missing bolts or nuts
- all bolts and nuts installed correct sizes and grades
- all bolts and nuts torqued as per specifications
- minimum threads protruding from any bolt should be 2mm
- check all newly installed members/plates/ bolts galvanising
- lightning spikes installed
- all antenna mounting brackets securely installed
- tower members are straight
- no twist or yaw visible in the tower
- legs levelled and tower vertically aligned (visual or theodolite?)
- tower is level and plumb
- all members comply with the structural analysis report
- all bolts comply with the structural analysis report

Tower Finish

- inspect galvanising for damage. All chips/ cracks treated.
- checks for signs of rust or corrosion
- towers painted according to specifications
- all nicks and scratches touched up

Lightning protection

- check condition of lightning spike and arrestor
- check that all lightning components are present
- lightning system is correctly grounded

Commissioning

- Operator Sweeps Test Onsite Post Installation Fiber Test (Low/Middle/High band)
- Complete Electrical Work and Installation of PSU and Rectifiers
- Commission PSU & Configure alarms

- Prep & Install Headrail + fit all cables
- Complete labelling
- Earth Testing, Electrical Certs

2.3.4 Proposed Grid Connection

2.3.4.1 Site Preparations

Prior to beginning construction work the contractor will scan the proposed route with a Cable Avoidance Tool (CAT), carry out visual inspection of the area and may carry out further below ground surveys if deemed necessary. If any previously unidentified services are discovered the site engineer will inform the design of the issues and possibly recommend a solution that works with the new constraints.

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

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

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

2.3.4.2 Trenching and Ducting

The proposed cables (33kV, 38kV, 110kV and 220kV) will be installed in a series of ducts in an excavated trench. Trenching will be achieved using a mechanical excavator. The top layer of soil or road surfacing will be removed and stockpiled separately for reuse. Material stockpiles should be stored at least 15 m back from drains and watercourses on level ground with a silt fence inserted at the base to prevent runoff.

The trench base will be graded and smoothed once the required depth and width is achieved. A layer of bedding material will be placed and compacted to the required specification on the trench floor prior to laying the ducts in trefoil formation.

The ducting surrounds will be carefully backfilled and compacted in accordance with the required specification. Cable protection strips will be placed on compacted material directly above the ducting. A secure cap will be placed at the end of each duct to prevent the ingress of dirt or water.

Ground water and surface water accumulating in the base of trenches will not be pumped directly to roadside drains or watercourses unless it is clean and free from solids. Contaminated water will be either treated onsite prior to discharge or tankered offsite to a suitably licensed disposal facility.

For concrete and asphalt/bitumen road sections, surfaces will be permanently reinstated in accordance with the specification and to the approval of the local authority and/or private landowners. All trench works carried out in public roadways will be carried out in accordance with 'Guidelines for Opening,

Backfilling and Reinstatement of trenches in Public Roads and any other conditions imposed by the relevant road authority.

For unsurfaced/grass sections, trenches will be backfilled with suitable excavated material to ground level leaving at least 100 mm topsoil or match existing level at the top to allow for seeding or replace turves as per the specification of the local authority or landowner.

Ducting will be cleaned and tested in accordance with the specification by pulling through a brush and mandrel. A draw rope will be installed in each duct in preparation for cable installation at a later date.

2.3.4.3 Proposed 110kV Underground Cabling Route

The Proposed 110kV Underground Cabling Route works will consist of the installation of ducts in an excavated trench to accommodate electrical and fibre communications cables to facilitate a connection between the Proposed 110kV Substation and the Proposed 220kV Loop-in Substation. Please see Appendix 4-1 for details.

The 110kV electrical cabling will be laid beneath the surface of the existing farm access road to be upgraded, the public road network and within proposed new roads within agricultural fields using the following methodology:

- Before works commence, updated surveying will take place along the proposed cable route, with all existing culverts and services identified. All relevant bodies i.e., ESNB, Waterford County Council etc. will be contacted and all up to date information for all existing services sought.
- When the cable is located on public roads, a traffic management plan will be prepared prior to any works commencing. A road opening licence will be obtained where required and all plant operators and general operatives will be inducted and informed as to the location of any services.
- A tracked 360-degree excavator will then proceed to dig out the proposed trench, typically to a depth of 1.2m, within which the ducts will be laid.
- The cable ducts will be concrete surrounded where they pass under the public road and under drains or culverts.
- Trench supports will be installed, or the trench sides will be benched or battered back where appropriate and any ingress of ground water will be removed from the trench using submersible pumps, fitted with appropriate silt filtration systems, to prevent contamination of any watercourse.
- Once the trench has been excavated, a base-layer will be laid and compacted, comprising UGM Type A, or 15 Newton CBM4 concrete as required.
- The ducting will be installed as per specification, with couplers fitted and capped to prevent any dirt etc. entering the duct. In poor ground conditions, the ends of the ducts will be shimmed up from the bed of the trench, to prevent any possible ingress of water dirt. The shims will be removed again once the next length has been connected. Extreme care will be taken to ensure that all duct collars (both ends) are clean and in good condition prior to ducts being joined.
- As the works progress, the as-built location of the ducting will be recorded using a total station or GPS.
- As per the associated base-layer (UGM Type A material or 15 Newton CBM4 concrete) will be installed and compacted as per approved detail, with care not to displace the ducting.
- Spacers will be used to ensure that the correct cover is achieved at both sides of the ducting.
- The remainder of the trench will be backfilled in two compacted layers with approved engineer's specified material.
- Yellow marker warning tape will be installed across the width of the trench, at 300mm depth,

- The finished surface is to be reinstated, as per original specification. Off-road cabling may be finished with granular fill to facilitate access to the trench for any potential maintenance that is required during the operational phase of the Proposed Project.
- Marker posts will then be placed at regular intervals (generally at joint bays and any change in direction) to denote the location of the underground cabling.

2.3.4.4 110kV Joint Bays

110kV 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 ducting route generally between 600 to 800 metres intervals or as otherwise required by ESB/EirGrid and electrical requirements. Joint Bays are typically 2.5m x 6m x 2m 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 jointing of the communication cabling. 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 electrical cabling, 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 proximity to Joint Bays. Earth Sheath Link Chambers and Communication Chambers will be pre-cast concrete structures with a steel access cover at finished surface level. The locations of the joint bays and chambers are shown on the Grid Connection Infrastructure drawings in Appendix 4-1.

The precise siting of all Joint Bays, Earth Sheath Link Chambers and Communication Chambers within the Proposed Grid Connection site assessed is subject to approval by ESB/EirGrid.

2.3.4.5 Proposed 220kV Loop-in Substation and Control Buildings

A detailed drawing of the Proposed 220kV AIS Loop-in Substation is shown in Appendix 4-1 of the EIAR. The Proposed 220kV AIS Loop-in Substation will be constructed largely using the same methodology as the Proposed 110kV Substation (see Section 2.3.3.13 above), however with some key differences as follows:

- The 220kV Air-Insulated Substation (AIS) building will be in a compound of approximately 170m by 152m, surrounded by a 2.6m-high palisade fence with a total area c. 23,211m²
- The substation drainage will be marked by a qualified engineer.
- A drainage system shall be installed around the compound area.
- Topsoil and subsoil shall be removed from the footprint of the compound using an excavator.
- A layer of geotextile material shall be laid over the footprint of the compound.
- Using an excavator, a base of UGM Type A material shall be laid followed by a 6F2 layer which will provide a finished surface. UGM Type A material is a specific type of material used in road construction and sub-base layers consisted of crushed stone, crushed concrete, or a mixture of both, 6F2 material is a granular fill material consisting of crushed concrete, crushed brick, or reclaimed construction aggregate.

- Each layer will be compacted using a vibrating roller.
- Earthing cable will be laid underground around the vicinity of the substation for connection to various electrical components during the electrical fit-out phase.
- Lightning protection masts with an approximate height of 18m shall be installed to provide lightning protection to the substation compound
- The 2 no. new steel masts are required to connect the 220kV overhead lines into the Proposed 220kV Loop-in Substation – these will be constructed in line with the methodology outlined in Section 4.8.2.6 below.
- The electrical equipment will be installed and commissioned.
- Perimeter fencing will be erected.

2.3.4.6 220kV Underground Electrical Cabling

The 220kV underground electrical cabling works will consist of the installation of ducts in an excavated trench to accommodate electrical and fibre communications cables to facilitate a connection between the Proposed 220kV Substation and the proposed 220kV end masts. Please see Appendix 4-1 for details.

The 220kV underground electrical cabling will be installed within new proposed access roads using the following methodology:

- Before works commence, updated surveying will take place along the proposed cable route, with all existing culverts and services identified. All relevant bodies i.e., ESNB, Waterford City and County Council etc. will be contacted and all up to date information for all existing services sought.
- A tracked 360-degree excavator will dig out the proposed trench, typically to a depth of 1.4m, within which the ducts will be laid.
- The cable ducts will be concrete surrounded.
- Trench supports will be installed, or the trench sides will be benched or battered back where appropriate and any ingress of ground water will be removed from the trench using submersible pumps, fitted with appropriate silt filtration systems, to prevent contamination of any watercourse.
- Once the trench has been excavated, a base-layer will be laid and compacted, comprising UGM Type A, or 15 Newton CBM4 concrete as required.
- The ducting will be installed as per specification, with couplers fitted and capped to prevent any dirt etc. entering the duct. In poor ground conditions, the ends of the ducts will be shimmed up from the bed of the trench, to prevent any possible ingress of water dirt. The shims will be removed again once the next length has been connected. Extreme care will be taken to ensure that all duct collars (both ends) are clean and in good condition prior to ducts being joined.
- As the works progress, the as-built location of the ducting will be recorded using a total station or GPS.
- As per the associated base-layer (UGM Type A material or 15 Newton CBM4 concrete) will be installed and compacted as per approved detail, with care not to displace the ducting.
- Spacers will be used to ensure that the correct cover is achieved at both sides of the ducting.
- The remainder of the trench will be backfilled in two compacted layers with approved engineer's specified material.
- Yellow marker warning tape will be installed across the width of the trench, at 300mm depth,
- The finished surface is to be reinstated, as per original specification. Off-road cabling may be finished with granular fill to facilitate access to the trench for any potential maintenance that is required.
- Marker posts will then be placed to denote the location of the underground cabling.

2.3.4.7 220kV End Masts

It is proposed to connect the Proposed 220kV Loop-in Substation to the existing 220kV Knockraha-Cullenagh OHL. Two proposed 220kV end masts (lattice type towers) will be located immediately beneath the existing 220kV OHL. The existing 220kV OHL conductor will be terminated at these end masts to facilitate a new OHL loop connection following the proposed 506m and 58m 220kV underground electrical cabling routes leading from the proposed 220kV end masts to the Proposed 220kV Loop-in Substation. The following section outlines the construction methodology for the new loop in tower structures which will be constructed underneath the existing 220kV OHL:

- The Steel lattice tower sites are scanned for underground services such as cables etc.
- A foundation c.5.7m x 5.7m is excavated and the formation levels (depths) will be checked by the on-site foreman. The excavated material will be temporarily stored close to the excavation and excess material will be used as berms along the grid access track.
- To aid construction, a concrete pipe is placed into each excavation to allow operatives level the mast at the bottom of the excavation. The frame of the reinforcing bars will be prepared and strapped to a concrete pipe with spacers as required. The reinforcing bars will be lifted into each excavated foundation using the excavator and chains/slings. The base and body section of each tower will then be assembled next to excavation.
- Concrete trucks will pour concrete directly into each excavation in distinct stages.
- A third pour for the leg of the tower 1m x 1m and will be 300mm over ground level.
- Once the main concrete foundation pour is cured after circa five days, metal shuttering is installed to accommodate the placement of concrete around the tower legs. During each pour, the concrete will be vibrated thoroughly using a vibrating poker.
- Once the concrete is set after the five days the shuttering is removed.
- The tower foundations will be backfilled one leg at a time with the material already excavated at the location. The backfill will be placed and compacted in layers. All dimensions will be checked following the backfilling process.
- The existing overhead line will be de-energised by ESB so work can commence on the construction of the towers.
- An earth mat consisting of copper or aluminium wire will be laid circa 400mm below ground around the tower. This earth mat is a requirement for the electrical connection of the equipment on the tower structure.
- Once the base section of each tower is completed and the concrete sufficiently cured, it is ready to receive the tower body. Temporary hardstands may be removed and disposed of off site where necessary.
- A hardstand area for the crane will be created by laying geogrid material on the ground surface and overlaying this geogrid with a suitable grade of aggregate.
- A physical barrier (Heras Fence Site Boundary) will be put in place to restrict plant from coming too close to the OHL.
- The towers will be constructed lying flat on the ground beside the recently installed tower base.
- The conductor will be moved off centre using a stay wire and weights to anchor the stay wire to ground.
- The tower section will be lifted into place using the crane and guide ropes.
- The body sections will be bolted into position.
- The conductor will be centred over the towers and held in place. Once the conductor is secured at both ends it is then cut and attached onto each tower. The small section of conductor in between the two towers will be removed and utilised as connector wire for the new towers.

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2.3.4.8 Existing Underground Services

Any underground services encountered along the Proposed 110kV Underground Cabling Route will be surveyed for level and the ducting will pass over the service provided adequate cover is available. A minimum clearance of 300 mm will be required between the bottom of the ducts and the service in question. If the clearance cannot be achieved the ducting will pass under the service and again 300 mm clearance between the top of the communications duct and bottom of the service will be achieved. In deeper excavations an additional layer of marker tape will be installed between the communications duct and top-level yellow marker tape. If the required separation distances cannot be achieved then a number of alternative options are available such as using steel plates laid across the width of the trench and using 35N concrete surrounding the proposed ducting, with marker tape on the side of the trench. Back fill around any utility services will be with dead sand/pea shingle where appropriate.

2.3.4.9 Construction Compound

1 no. construction compound will be required to facilitate the construction of the Proposed 220kV Loop-in Substation. The construction methodology for this is discussed in Section 2.3.3.4 above.

2.3.4.10 Site Drainage System

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

The EIAR includes a drainage design required for the purposes of assessing the potential effects of the Proposed Project. The drainage design will be developed further with a level of construction detail necessary to implement the measures onsite. The detailed (construction phase) drainage design will form part of the updated Main Contractor's CEMP, and the effective implementation of the detailed drainage design will be audited by the ECoW (who will demonstrable freshwater pearl mussel experience). Surface water management and drainage design principles are outlined in Section 3.2.2 below, Chapter 4, Section 4.6 and Appendix 4-4 Surface Water Management Plan of the EIAR.

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 would result in significantly less erosion and siltation. Construction activities in the hydrological buffer zones shall be avoided during or after prolonged rainfall or an intense rainfall event and work will cease entirely near watercourses when it is evident that water quality is being impacted.

3.2.2 Site Drainage Principles

The 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.
- 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.
- 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.

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. 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.

3.2.3 Legislation and Best Practice Guidance

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

There is no one guidance document that deals with drainage management and water quality controls for wind farm 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:

- Forestry Commission (2011): Forests and Water UK Forestry Standard Guidelines, Fifth Edition. Publ. Forestry Commission, Edinburgh;
- Circular Letter PL 1/2017: Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive);
- Environmental Protection Agency (2022): Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022);
- EPA Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects (2021)
- Institute of Geologists Ireland (2013) Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- DoE/NIEA (2015): Wind farms and groundwater impacts - A guide to EIA and Planning considerations”;
- OPW (2009) The Planning System and Flood Risk Management;
- National Roads Authority (2008) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- Wind Energy Development Guidelines for Planning Authorities, 2006 (the Guidelines (DoEHLG, 2006)) and the Draft Revised Wind Energy Development Guidelines (the Draft Guidelines (DoEHLG, 2019));
- Inland Fisheries Ireland (2016): Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Watercourses;
- Good Practice During Wind Farm Construction (Scottish Natural Heritage, 2010);
- CIRIA (Construction Industry Research and Information Association) Guidance on ‘Control of Water Pollution from Linear Construction Projects’ (CIRIA Report No. C648, 2006);
- Wind Farms and Groundwater Impacts: A guide to EIA and Planning considerations (DoE/NIEA, April 2015);
- Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. CIRIA C532. London, 2001;
- Land Types for Afforestation (Forest Service, 2016b);
- Forest Protection Guidelines (Forest Service, 2002);
- Forest Operations and Water Protection Guidelines (Coillte, 2013);
- Forestry and Water Quality Guidelines (Forest Service, 2000b); and,
- Forests and Water, Achieving Objectives under Ireland’s River Basin Management Plan 2018-2021 (DAFM, 2018).

- Water Action Plan 2024: A River Basin Management Plan for Ireland 2022–2027 (DHLGH, 2024)
- Standards for Felling and Reforestation (DAFM, 2019)

3.2.4 Site Drainage Design and Management

The proposed site drainage features for this Site are outlined briefly in Section 4.6 of the EIAR and in depth in Appendix 4-4 Surface Water Management Plan. As this CEMP is a working document and is presented as an Appendix to the EIAR, the drainage measures are not included in this document. When the final CEMP report is prepared, and presented as a standalone document, all drainage measures will be included in that document. These drainage proposals will be developed further prior to the commencement of construction as part of the detailed drainage design. The following sections give an outline of drainage management arrangements in terms of pre-construction, construction, operational and decommissioning phases of the Proposed Project.

3.2.4.1 Pre-Construction Drainage

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

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

The routes of any natural drainage features will not be altered as part of the Proposed Project. Turbine locations have been selected to avoid natural watercourses. There will be no direct discharges to natural watercourses. All discharges from the proposed works areas or from interceptor drains will be made over vegetated ground at an appropriate distance from watercourses. Buffer zones around the existing natural drainage features have informed the layout of the Proposed Project and are indicated on the drainage design drawings.

Where artificial drains are currently in place in the vicinity of proposed works areas, these drains may have to be diverted around the proposed works areas to minimise the amount of water in the vicinity of works areas.

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

Existing artificial drains in the vicinity of existing roads to be upgraded will be maintained in their present location where possible. If it is expected that these artificial drains will receive drainage water from works areas post treatment, check dams will be added (as specified below) to control flows and sediment loads in these existing artificial drains. If road widening or improvement works are necessary along the existing roads, where possible, the works will take place on the opposite side of the road to the drain.

3.2.4.2 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/recharge to ground.
- Collect potentially silt-laden runoff from works areas via downgradient collector drains and manage via series of avoidance, source, in-line treatment and discharge to ground via infiltration drains and infiltration areas.
- There is no direct hydraulic connectivity from proposed construction areas to natural watercourses or drains connecting to downstream watercourses.
- Maintain the existing hydrology/hydrogeology of the Site.
- Re-routing existing local drainage pathways as required.
- Daily inspection and recording of surface water management system by on-site 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.

Runoff control and drainage management are key elements in terms of mitigation against impacts on surface water bodies. Two distinct methods will be employed to manage drainage water within the Site. The first method involves ‘keeping clean water clean’ by avoiding disturbance to existing 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 new proposed silt traps and settlement ponds (or stilling ponds) prior to controlled diffuse release into the existing drainage network. There will be no direct discharges to the existing hydrological features (forestry and agricultural drains or natural watercourses).

Site drainage design and management are further detailed Appendix 4-4: ‘*Surface Water Management Plan*’.

3.3 Archaeological Management

This section of the CEMP provides an outline of the mitigation measures outlined in Chapter 14: ‘*Archaeological, Architectural and Cultural Heritage*’ of the EIAR for the construction phase of the Proposed Project.

There are no UNESCO World Heritage Sites or National Monuments located within or along the Site.

Four National Monuments are located within 10km of the Proposed Turbines, three of which are located in County Waterford and one in County Cork. The nearest of these is Dungarvan Castle (Nat. Mon. No. 569) which is located over 6km to the north-east of T6. The walled town of Dungarvan is located c. 5.7km to the north-east of the Site, while the walled town of Youghal is c. 10km to the south-west. As walled towns both Dungarvan and Youghal and their town defences are also considered national monuments.

Two recorded monuments are located within the Site and comprise a mine (WA035-009—) and an unclassified cairn (WA035-008—). These are 519m and 540m from the nearest Proposed Turbine respectively.

Pre-development testing, under licence from the National Monument Service (NMS), will be carried out. Testing will only be undertaken in areas where ground disturbance will take place as part of the Proposed Project. The areas to be tested will be chosen by the appointed archaeologist and the number of test trenches agreed between the archaeologist and the NMS through the licensing system. A report on the testing will be compiled on completion of the work. Should archaeological finds, structures or deposits be uncovered as a result of the testing further mitigation measures such as preservation in situ or preservation by record (excavation) may be required and will be decided in consultation with the NMS.

Archaeological monitoring of ground works during the construction stage of the Proposed Project under licence from the NMS will be carried out by a suitably qualified archaeologist. Should archaeological finds, structures or deposits be uncovered as a result of the monitoring further mitigation measures such as preservation in situ or preservation by record (excavation) may be required and will be decided in consultation with the NMS. Such mitigation measures will be implemented where relevant following consultation with the NMS. A report detailing the results of the monitoring and/or any further necessary mitigation as referred to above will be compiled on completion of the work and submitted to the NMS and Planning Authority/Body.

3.4 Traffic Management

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

3.4.1 Site Entrances

The main construction access point for the Proposed Wind Farm (Access Point 1 below in Figure 3-1) will be located on the L2024 in the townland of Pulla, approximately 1.1km west of the L2024 junction with the N25. The majority of turbine components and general construction traffic will use this entrance. An existing gravel forest access junction at this location will be upgraded to achieve appropriate visibility splays and to accommodate the largest abnormal load deliveries including turbine components. On completion of the construction phase, this Site entrance will be reduced in size and gated for security and will be used as an operational Site entrance.

Secondary Entrances

Two additional access points (Access Point 2 and 3) will be used for construction and operational access to the Proposed Project and these would be located on the L2024 to the west of the main access. Access point 2 would provide a junction leading south from the L2024 into the Site for general construction traffic (not abnormal load vehicles) and would provide the most direct access to the Proposed 110kV Substation. Access point 3 would comprise a crossroad junction leading north and south of the L2024 and would be used to facilitate general construction traffic and abnormal load vehicles. For the latter (Access Point 3), it is noted that traffic would cross straight over the junction having accessed the Site via the Main Entrance to the east and travelled to this location via the internal access road network. Abnormal loads seeking to access the turbine locations north of the L2024 would use this route.

220kV Loop-in Substation Site Entrance

A general construction traffic entrance for the Proposed 220kV Loop-in Substation complex will be constructed off of the L99997 local road in the townland of Graigue (Access Point 8). This entrance will be used as the main entrance for construction traffic throughout the construction phase of the substation. Swept path analysis and a preliminary junction design have been undertaken based on the largest vehicle which would require access to the substation i.e. the transformer delivery vehicle.

On completion of the construction phase, the access arrangement will be reduced to the permanent works only and used as an operational entrance for inspection and maintenance of the substation when required. The access will just be used by small vehicles on an infrequent basis.

Additional Junction Upgrades

Cross road junctions on the minor road network will be upgraded at locations 4, 5 and 6 on **Error! Reference source not found.** to facilitate movement of general construction traffic and abnormal load vehicles within the Site. Two new junctions will be created at location 4. At locations 5 and 6, one existing junction will be upgraded, and one new junction will be created. It is noted that the crossroad junctions will be used by vehicles travelling across the minor roads and will not involve vehicles turning from the minor roads.

Location 7 on **Error! Reference source not found.** indicates the junction of the R671 and the L99997. This junction will be upgraded to provide suitable visibility splays and access for transformer delivery vehicles. In order to minimise the volume of rock to be removed at this location, it is proposed that the transformer delivery vehicle would arrive via the R671 from the south and pull past the junction where the towing vehicle would be reconfigured to draw the load back to the access junction without the need to turn the load itself.

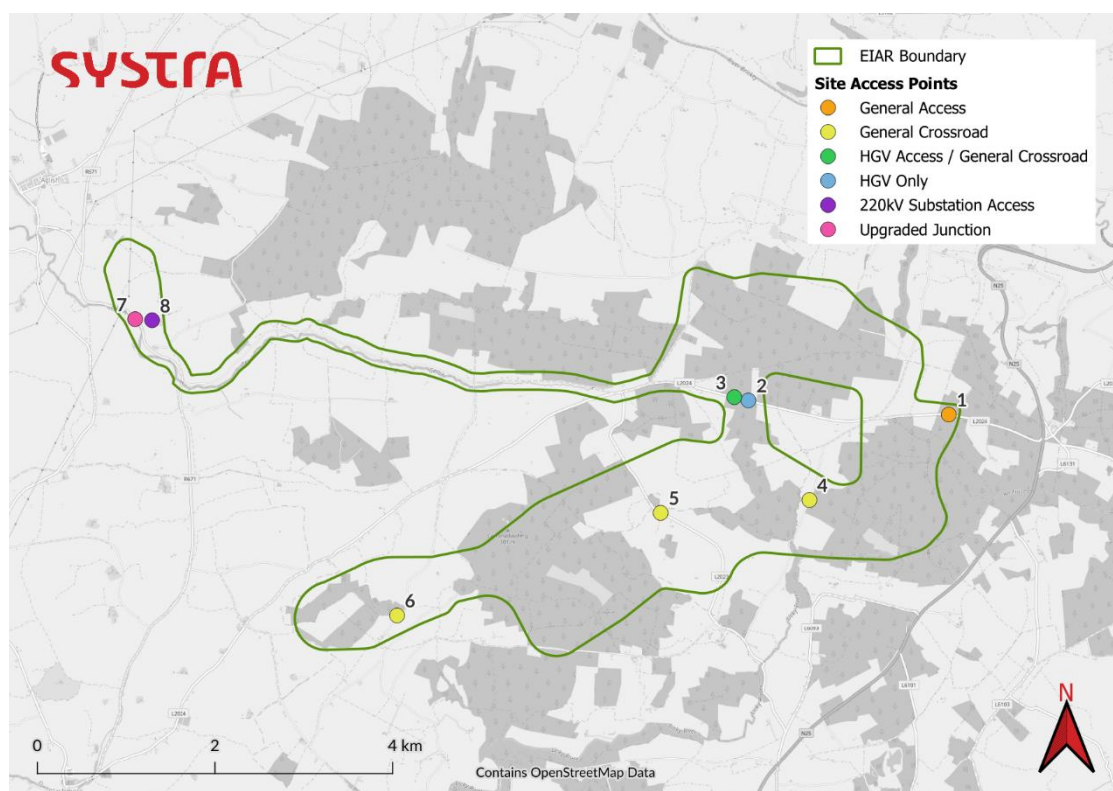


Figure 3-1: Proposed Access Locations

3.4.2 Turbine Component Transport Route

For the purpose of this EIAR, the Port of Waterford has been selected and assessed to facilitate turbine delivery to the Site. It is proposed that the large wind turbine components will be delivered from Belview Port (Port of Waterford), Co. Waterford to the Site via the N29 and N25 for approximately 62.8km, exiting at the L2024/N25 Junction in Pulla before heading west along the L2024 for 1.1km before reaching the main site entrance. The proposed turbine delivery route is shown on Figure 4-46 of Chapter 4 of the EIAR. All deliveries of turbine components to the Site will follow this route.

A turbine with the maximum blade length of 81.5 metres has been used in assessing the traffic impact of the Proposed Project. The blade transporter for such a turbine blade would have a total vehicle length of 87 metres, including the blade which overhangs the back of the vehicle. The total length of the tower transporter is 59.5 metres with the axles located at the front and rear of the load with no overhang.

The vehicles used to transport the nacelles will be similar to the tower transporter. All other vehicles requiring access to the Site will be smaller than the large turbine component transport vehicles. The turbine delivery vehicles have been modelled in the swept path assessments of identified pinch points along the proposed turbine delivery route, as detailed in Chapter 15: 'Material Assets' of this EIAR.

There are no significant turbine delivery route accommodation works required to facilitate the delivery of components to the Site.

Construction materials will be delivered to the Site via selected haul routes that will be determined based on the source of the construction material. Quarries within a 20km range of the Site that could potentially provide stone and concrete are illustrated on Figure 4-48 in Chapter 4. Traffic movements generated by the Proposed Project are discussed in Section 15.1 of Chapter 15.

3.4.2.1 **Proposed 110kV Substation and Proposed 110kV Underground Cabling Route**

It is proposed to construct a 110kV electricity substation within the Proposed Wind Farm site. The Proposed 110kV Substation is located within a forestry block and will be accessed via an existing forestry access junction off the L-2024 connected to the Proposed Wind Farm access roads.

It is proposed to connect the Proposed 110kV Substation to the Proposed 220kV Loop-in Substation in the townland of Ballycullane, Co Waterford via 110kV underground electrical cabling. The Proposed 110kV Underground Cabling Route is approximately 9km in length and located primarily within the public road corridor, with a short section (approximately 262m) located within a private forestry road west of the proposed on-site substation and another short section (approximately 788m) being located within proposed new access roads through agricultural pastures in the townlands of Graigue and Ballycullane. 13 110kV joint bays (described in Section 2.5.2.4 above) are required along the Proposed 110kV Underground Cabling Route.

The Proposed 110kV Underground Cabling Route will originate at the Proposed 110kV substation and run north for approximately 262m through an existing site road towards the L2024 local road. The 110kV underground cabling route continues underneath the L2024 local road network for approximately 1.55km before following the L2021 west for approximately 5.2km. The Proposed 110kV Underground Cabling Route then follows the R671 regional road north for 900m before entering the L99997 local road for approximately 180m, traversing through agricultural pastures for approximately 788m before connecting into the Proposed 220kV Loop-in Substation.

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 100-150m will be constructed along the road network at any one time.

The construction methodology of providing a 110kV 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 cabling connections predominantly along the public road networks.

3.4.3 **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.

The implementation and monitoring of the TMP will be the responsibility of the Construction Manager. Further evolution of the TMP may be required during the detailed project planning and construction phases.

The Construction Manager may employ a number of sub-contractors on the Site who will fall under the auspices of the TMP will have an obligation to adhere to the plan written into their contracts.

3.4.3.1 **Transport Co-ordination**

The Construction Manager would be responsible for the co-ordination of all elements of HGV transport to and from the construction Site. The Construction Manager would be responsible for co-ordination and liaison with Waterford City and County Council and Transport Infrastructure Ireland, and the local community as necessary.

The Construction Manager would inform Waterford City and County Council and Transport Infrastructure Ireland of any significant matters that may affect traffic movement by means of reports issued at regular intervals or by day-to-day reports of any significant essential changes to transport plans necessitated by circumstances. Contact details for the Construction Manager would be made available to all relevant parties prior to commencement of works on Proposed Project Site.

3.4.3.2 **Monitoring of the TMP**

The TMP will be monitored by the Construction Manager who in turn would report to Waterford City and County Council and Transport Infrastructure Ireland. A report will be prepared by the Construction Manager at regular intervals during the construction stage (time interval to be agreed).

Meetings will be held with Waterford City and County Council and Transport Infrastructure Ireland as necessary, to discuss the TMP and any issues raised by the local community.

Use of the agreed routes by hauliers will be monitored by spot checks undertaken by the Construction Manager or the roads authority. These spot checks will take the form of occasional observations at key locations.

The information collected for the purposes of monitoring will be available to all stakeholders including the local community on request.

3.4.3.3 **Liaison with Local Community**

The key to the success of the TMP would be how it is communicated to the local community and how it is adapted to take on board feedback received.

As indicated above, a CLO would be appointed to act as a point of contact with the local community. The CLO would be responsible for keeping the local community informed of progress on the Proposed Project and providing notice of upcoming activities which may give rise to increased construction vehicle movements.

The CLO would also monitor for other construction activity in the area which may have an impact on the adjacent road network. Coordinating with the developers / contractors of any such works and the local community, the CLO will ensure that, where possible, cumulative impacts are kept to a minimum.

The CLO would be able to attend Community Council meetings to provide a report and to be on hand to answer any questions that the local community may have. Contact details would be provided

for the CLO (telephone number and email address) so that members of the public have an opportunity to ask questions and provide feedback. The CLO would also make use of the local press to disseminate information regarding traffic management and other activities.

3.4.3.4 Monitoring of the CTMP

The TMP will be monitored by the Construction Manager who in turn would report to Waterford City and County Council and other stakeholders as appropriate. Monitoring will include comparison of actual construction traffic flows, HGV movements, staff travel patterns and use of approved routes against the assumptions and measures set out in the TMP. Monitoring will also include review of compliance with delivery management measures, routing arrangements and traffic management controls.

A process will be established for the recording of traffic incidents, non-compliances, complaints and other transport-related issues arising during the construction stage. This will include incidents associated with routing, driver behaviour, road safety, congestion, parking, access, damage complaints or any breach of the TMP requirements. All such matters will be entered into an incident and complaint register maintained by the Construction Manager.

Use of the agreed and designated routes by hauliers would be monitored by undertaking spot checks by the Construction Manager. These spot checks would take the form of observations or surveys at key locations. The information collected from the spot checks would be held by the Construction Manager and made available on request. Site vehicles can carry identification stickers, so it is clear that they are serving the Proposed Project.

As necessary, meetings will be held with Waterford City and County Council and/ or other stakeholders to discuss the TMP and any issues raised through monitoring, incidents, complaints or community feedback.

3.5 Dust Suppression

In periods of extended dry weather, dust suppression may be required within the Site, along haul roads, and public road corridors to prevent dust from becoming a nuisance. If necessary, water will be taken from stilling/settlement ponds in the Site's drainage system and will be pumped into a bowser or water spreader to dampen down the above mentioned areas to prevent the generation of dust. Silty or oily water will not be used for dust suppression, as 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.

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 required within the Proposed Wind Farm site, along haul roads, public road corridors, proposed new roads on private agricultural land, and proposed upgrades to existing private tracks associated with the Proposed Grid Connection, to prevent dust from becoming a nuisance. If necessary, water will be taken from stilling/settlement ponds in the Proposed Wind Farm drainage system and will be pumped into a bowser or water spreader to dampen down haul roads and 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.
- 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 for damage/potholes and repaired as necessary.
- The transportation of materials from the borrow pit around the Site will be covered by tarpaulin or similar covered vehicles where necessary.
- Any required transportation of construction materials from locally sourced quarries to the Site will be covered by tarpaulin where necessary.
- If necessary, excavated material will be dampened prior to transport to the spoil void borrow pits or linear berms.
- Waste material will be transferred to a licensed/permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF facility will be local to the Proposed Project to reduce the level of emissions associated with vehicle movement.

Wheels or vehicle underbodies are often washed before leaving sites to prevent the build-up of mud on public (and site) roads. Additionally, wheel washes facilities will be provided on Site. The Proposed Wind Farm site & Proposed Grid Connection 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 contract documents will specify that the contractor undertaking the construction works will be obliged to adopt best practice noise abatement measures contained in British Standard BS 5228-1:2009+A1:2014 '*Code of practice for noise and vibration control on construction and open sites – Noise*' and BS 5228-2:2009+A1:2014 '*Code of practice for noise and vibration control on construction and open sites – Vibration*'.

The following best practice mitigation measures from these documents will be implemented as required for the duration of the construction and decommissioning phases:

- Limiting the hours during which site activities likely to create high levels of noise or vibration are permitted;

- Establishing channels of communication between the contractor/developer, Local Authority and residents;
- Monitoring typical levels of noise and vibration during critical periods and at sensitive locations;
- Selection of plant with low inherent potential for generation of noise and/ or vibration where practical;
- Placing of noise generating / vibratory plant as far away from sensitive receptors as practical within the site constraints, and;
- The hours of construction activity will be limited to avoid unsociable hours where possible. Works operations shall generally be restricted to between 7:00hrs and 19:00hrs Monday to Saturday. However, to ensure that optimal use is made of good weather periods or at critical periods within the programme (i.e. concrete pours, turbine component deliveries) it could occasionally be necessary to work out of these hours.

And more specifically:

- The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations.
- Compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers.
- Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use.
- Any plant, such as generators or pumps, which is required to operate outside of general construction hours will be surrounded by an acoustic enclosure or portable screen as appropriate.

An assessment of the operational wind turbine noise levels has been undertaken in accordance with best practice guidelines and procedures as outlined in Section 12.3 of the EIAR. The findings of the assessment have confirmed that the predicted operational noise levels associated with the Proposed Wind Farm will be within best practice turbine noise criteria at all locations with no significant cumulative impacts or effects.

The findings of the assessment confirmed that the predicted operational noise levels from the Proposed Wind Farm will be within the relevant best practice noise criteria for the detailed potential turbine specification. Therefore, no specific mitigation measures are required.

In the unlikely event that an issue with low frequency noise is associated with the Proposed Project, it is recommended that an appropriate detailed investigation be undertaken. Due consideration should be given to guidance on conducting such an investigation which is outlined in Appendix VI of the EPA document entitled '*Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities*' (NG4) (EPA, 2016). This guidance is based on the threshold values outlined in the Salford University document '*Procedure for the assessment of low frequency noise complaints, Revision 1, December 2011*'. A noise complaint management protocol, which includes for low frequency noise complaints, has been included as Appendix 12-7 of the EIAR.

3.7

Invasive Species Management

During the multi-disciplinary walkover surveys, a search for non-native invasive species was undertaken within the Site. The survey focused on the identification of invasive species listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (As Amended) (S.I. 355 of 2015). As outlined in Chapter 6: '*Biodiversity*' of the EIAR, *Rhododendron ponticum*, a third schedule invasive species was identified within the Site.

In the absence of mitigation there is potential for spread of invasive species to other habitats within the Proposed Wind Farm site and outside of the Site. This could occur via dispersal of seeds locally, or inappropriate disposal of the plant material whereby seeds or propagatable material are spread to another area. Vector material may also be spread to other sites as a result of entrainment within machinery or staff clothing. The following measures will be in place to avoid impacts to biosecurity as a result of construction of the Proposed Project:

Rhododendron regrows vigorously when cut. As a result, some method of stump killing or removal is always necessary. Any untreated cut stump will regrow and in most cases flower within 3-4 years. The following site hygiene and biosecurity measures will be adhered to for the management of invasive species within the Site:

- All works in relation to the invasive species will be supervised by an ECoW.
- All staff will be given a Toolbox Talk, by a suitably qualified person or ecologist, on invasive species removal in relation to Rhododendron and its management on site.
- The contractor will assign a member of their team as Environmental Officer to ensure the management plan is adhered to throughout the proposed works.
- A designated bio-secure area/exclusion zone will be set up at recorded invasive species locations to prevent disturbance in these areas. Invasive species will be marked with hazard tape in order to identify the species prior to vegetation clearance works and to keep it separate from other brash material.
- All machinery should be thoroughly cleaned down prior to arriving on the Site to avoid the potential spread of invasive species from elsewhere.
- Machinery that is used for excavation and onsite removal of invasive material will not be used for any other works until they are fully cleaned down and then visually inspected by a specialist to ensure no fragments of invasive plant material are present.
- Prior to leaving the invasive species exclusion zones, all boots and clothing will be thoroughly brushed down to remove any contaminated material prior to leaving the area.
- As a precautionary measure, machinery will be thoroughly cleaned down before exiting the Site to prevent potential spread of invasive species elsewhere.
- Clean down will be carried out using brushes and shovels and power washing will be avoided insofar as possible. This is to prevent potentially contaminated run-off spreading outside the Site.
- Material used for tracking machinery out of the contaminated areas onsite e.g. plywood will be thoroughly cleaned down under supervision of the ECoW prior to removal off site.
- Any soil and topsoil required on the Site will be sourced from a stock that has been screened for the presence of any invasive species and where it is confirmed that none are present.

Construction Management Measures

- Prior to the commencement of any works, the following site setup procedures will be carried out:
- A pre-commencement survey for Rhododendron will be undertaken by a fully qualified ecologist to determine the locations and extent of the species within the Proposed Wind Farm and to determine whether there have been any changes in the extent of the infestation since the undertaking of the baseline surveys.
- The locations and extent of Rhododendron within the Proposed Wind Farm will be clearly marked out using hazard tape to ensure they are not disturbed.
- For Rhododendron stands that occur outside of the permanent built infrastructure footprint and will not be directly impacted, a 10m buffer zone (Higgins, G.T. 2008) surrounding each stand will also be applied using temporary fencing, to avoid disturbance of potentially contaminated soils.

Due to the young age and small size of the infestations recorded within the Proposed Wind Farm, it is proposed to treat the plant in-situ. The recommended option for in-situ treatment is to manually remove

the upper parts of the plant and apply the Ecoplug method (Willoughby et al. 2017) as to avoid spray drift and to minimise the potential for spraying of non-target species. An Ecoplug is a sealed plastic capsule containing a measured dose of granular glyphosate herbicide. The capsule is inserted into a drilled hole in a freshly cut tree stump and hammered into place. Once activated, the glyphosate is released into the stump's vascular system and transported throughout the stump and root system, killing the tree and preventing regrowth. The Ecoplug method is outlined below.

- Cut the tree/plant as close to the ground as possible.
- The cut material can be stacked and stored onsite, used as firewood or mulched.
- A 30 mm hole will be drilled into the remaining stump and the Ecoplug will be inserted into the hole until it is flush with the top of the stump.
- Where immature plants occur, hand pulling can be undertaken at any time of the year and left to dry out on an impermeable surface.

Where the Ecoplug method is unsatisfactory or where the plant requires removal due to being present within the permanent built infrastructure footprint, physical extraction of the root/stump from the ground will be carried out.

- Cut the tree/plant as close to the ground as possible.
- The root/stump will be removed from the ground using hand tool or an excavator.
- The cut material can be stacked and stored within the Proposed Wind Farm, used as firewood or mulched.
- The root/stump will be placed on an impermeable surface such as pallets or a radon barrier membrane and left to dry out.

Following treatment or eradication of the plant, excavated soil from the Site of infestations at the Proposed Wind Farm will still be considered to be contaminated on a precautionary basis. In order to avoid the potential spread of the species, the top layer of soil from the 10m buffer zone will be removed and if possible, used as back fill within the same infested area or stored outside of the permanent built infrastructure footprint within the Proposed Wind Farm. This area will then be fenced off and will be monitored and if necessary, re-treated following the initial treatment and should continue until no growth is recorded for a period of at least two consecutive years.

Alternatively, the excavated spoil from within the buffer zone can be transported to an offsite waste facility, under license from the NPWS.

Post Treatment Monitoring

Ongoing monitoring will be required, with suitable follow-up management in order to control new growth or re-establishment of this species within the infested areas.

Following the initial treatment and completion of construction of the Proposed Wind Farm, the treated areas will be re-surveyed annually and if necessary, re-treated until no growth is recorded for two consecutive years. If invasive plants are found to be re-establishing, they shall be treated as per the measures outlined in this ISMP.

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 Proposed Project. The WMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of construction of the Proposed Project. Disposal of waste will be seen as a last resort.

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

The Department of the Environment provides a document entitled, *'Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects'* (2021). It is important to emphasise that no demolition will take place at this Site, however, this document was referred to throughout the process of completing this WMP.

3.8.2 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 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 turbines and meteorological mast will be manufactured off-site and delivered to the Proposed Wind Farm site where on site erection will occur.

The turbine and meteorological mast foundations will consist of stone from the licensed 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 new site roads and existing roads for upgrade 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 underground electrical cabling (Proposed Grid Connection and Proposed Wind Farm) will consist of excavating sections of a trench, laying the ducting and cabling and backfilling.

The waste types arising from the construction phase of the Proposed Project are outlined in Table 3-1 below.

Table 3-1 Expected waste types arising during the Construction Phase

Material Type	Example	EW 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 110kV Underground Cabling Route	17 03 02

Hazardous wastes that may occur on site during the construction phase of the Proposed Project 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 the 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 Proposed 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 operational period of the Proposed Turbines is 35 years after which time a decision will be made to determine whether or not the turbines will be replaced by new turbines or if decommissioning will occur. The lengthy time frame between the completion of the construction phase and decommissioning will result in the only materials remaining on site at that time will be infrastructural material such as the turbine foundations, turbines and the granular material used to construct roads. When the Proposed Turbines are 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 3-2 below.

Table 3-2 Expected Waste types arising during the Decommissioning Phase

Material Type	Example	EW 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 01 10*, 13 01 11

3.8.3.5 Reuse

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

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

3.8.3.6 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.

3.8.3.7 Implementation

3.8.3.7.1 Roles and Responsibilities for Waste Management

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

3.8.3.7.2 Training

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

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

3.8.3.7.3 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

3.8.3.8 **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

4.1 Roles and Responsibilities

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

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

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

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

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

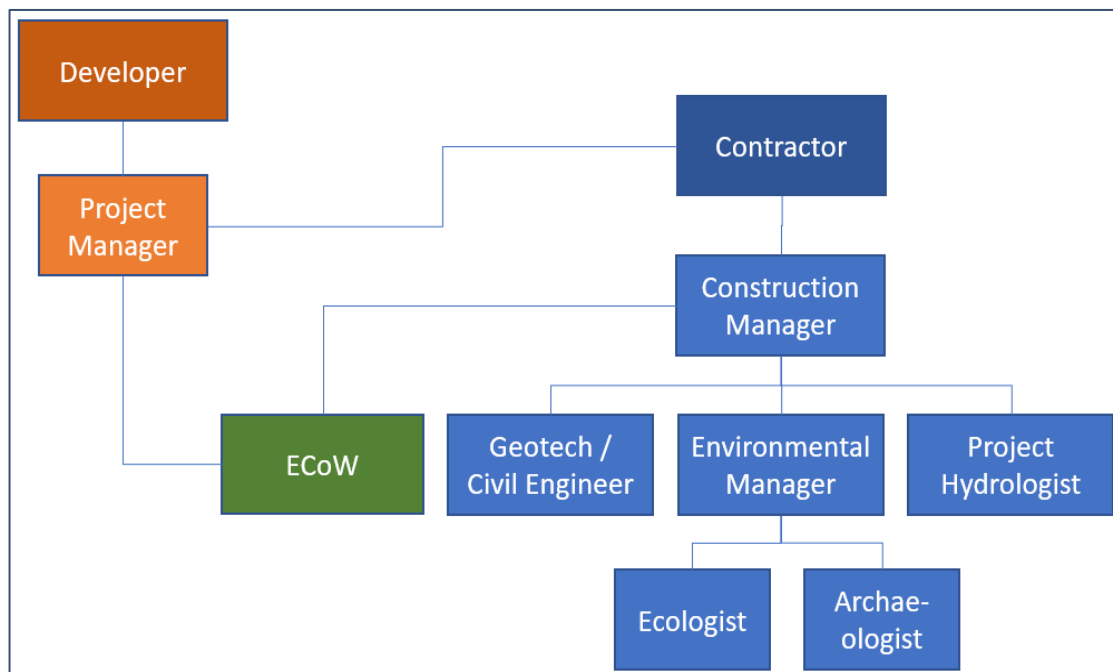


Figure 4-1 Proposed Project Organogram

Any requirement of the granted permission, for the works to be supervised by an engineer with professional indemnity insurance, who upon completion of the works, shall certify the said works, will

be adhered to. Such an engineer will be appointed to oversee and supervise the construction phase of the Proposed Project.

4.1.1 Construction Manager

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

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

4.1.2 Site Environmental Clerk of Works

The Project Developer will be required to engage 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. An ECoW with experience relating to freshwater pearl mussel will be appointed to the Site to oversee works in proximity to the River Licky. 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 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.

4.1.4 Project Hydrologist

The Project Hydrologist is part of the design team that will prepare the detailed drainage design for the construction phase of the Proposed Project, but will also support the ECoW in monitoring, overseeing and auditing the effective implementation of the detailed drainage design by the Project Contractor. The Project Hydrologist will not be 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:

- Preparation of detailed drainage design before construction commences;
- Input to the CEMP in respect of drainage design and water quality management;

- Attend site to support ECoW and oversee and audit the effective implementation of the detailed drainage design;
- Complete ongoing inspection and monitoring of the development, particularly in areas of drainage control in support of the ECoW in monitoring the effectiveness of the drainage design as it is implemented on-site.

4.1.5 **Project Archaeologist**

The Project Archaeologist will report to the Environmental Manager/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.

4.1.6 **Project Geotechnical Engineer/Civil Engineer**

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

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

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

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 felling and construction at the Site.

Analysis will be for a range of parameters with relevant regulatory limits along with Environmental Quality Standards (EQSs) and sampling will be undertaken at designated locations within the Site.

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 construction 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 and within the Proposed Wind Farm site, and specifically following heavy rainfall events (i.e. weekly, monthly and event based).

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

The following periodic inspection regime will be implemented:

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

4.2.2.2 Continuous Turbidity Monitoring

Turbidity monitors or sondes will 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 shall be undertaken as per water monitoring programme for the Proposed Project. This will not be restricted to just these locations around the 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 shall be undertaken for each primary watercourse along the Proposed 110kV Underground Cabling Route and within the Proposed Wind Farm site, 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 110kV 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.

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

4.2.3 Construction Phase Drainage Inspections & Maintenance

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

maintenance to ensure they continue to function effectively, and the Project Contractor is entirely responsible for this maintenance.

Regular inspections of all existing and installed drainage measures will 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 shall 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 shall 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 is to discuss the coming weeks activities and identify the relevant work method statements and sub plans that will be relevant to that week's activities. Additionally, any non-compliance identified during the previous week would also be discussed with the aim to reduce the potential of the same noncompliance reoccurring.

During construction of the Proposed Project, all staff will be made aware of and adhere to the Health & Safety Authority's '*Guidelines on the Procurement, Design and Management requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2013*'. This will encompass the use of all necessary Personal Protective Equipment and adherence to 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 construction 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. This will have a short-term potential significant negative impact on health and safety.

The Proposed Project will be constructed, operated and decommissioned in accordance with all relevant Health and Safety Legislation, including:

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

The following measures below are also detailed in Chapter 18: *'Schedule of Mitigation and Monitoring Measures'* and outlined in Table 7-1 and 8-1 below.

- A Health and Safety Plan covering all aspects of the construction process will address the Health and Safety requirements in detail. This will be prepared on a preliminary basis at the procurement stage and developed further at construction stage.
- All hazards will be identified, and risks assessed. Where elimination of the risk is not feasible, appropriate mitigation and/or control measures will be established. The contractor will be obliged under the construction contract and current health and safety legislation to adequately provide for all hazards and risks associated with the construction phase of the project. Safepass registration cards are required for all construction, delivery and security staff. Construction operatives will hold a valid Construction Skills Certificate Scheme card where required. The developer is required to ensure a competent contractor is appointed to carry out the construction works. The contractor will be responsible for the implementation of procedures outlined in the Safety and Health Plan. Public safety will be addressed by restricting Site access during construction. Fencing will be erected in areas of the Site where uncontrolled access is not permitted.
- The suitability of machinery and equipment for use near power lines will be risk assessed.
- All staff will be trained on operating voltages of overhead electricity lines running over the Site. All staff will be trained to be aware of the risks associated with overhead lines. All contractors that may visit the Site will be made aware of the location of overhead electricity 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
- 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 Health and Safety Plan.

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

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

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

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

6. EMERGENCY RESPONSE PLAN

6.1 Overview

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

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

6.1.1 Roles and Responsibilities

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

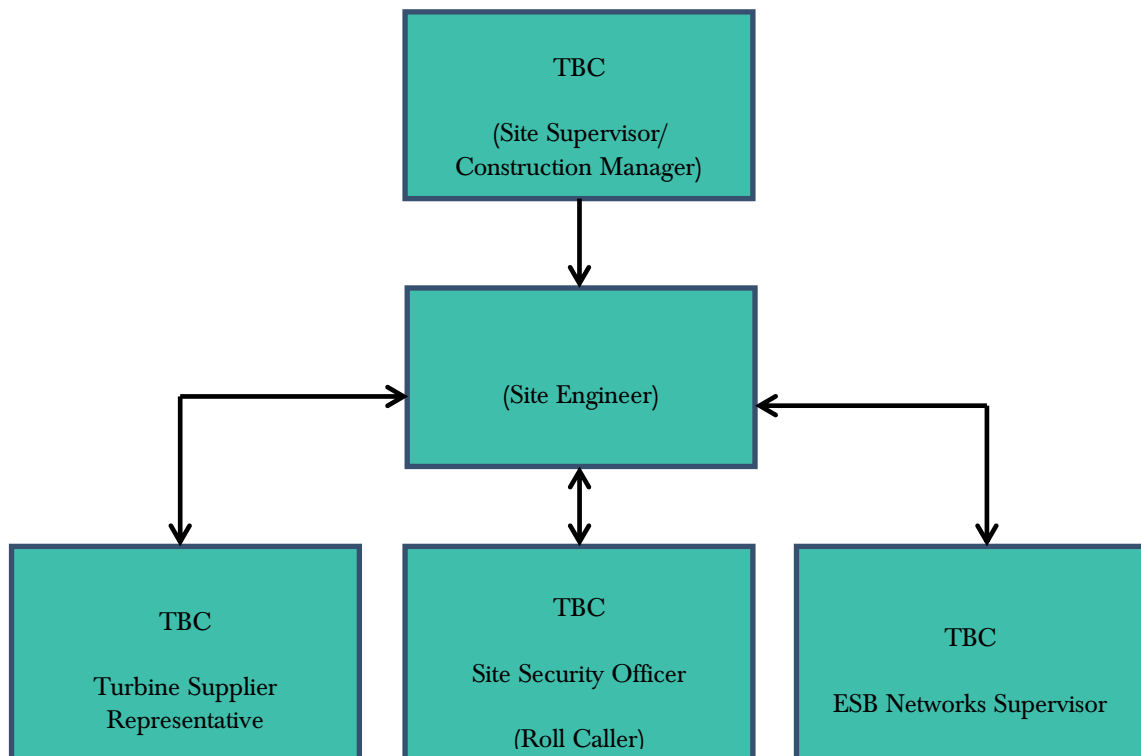


Figure 6-1 Emergency Response Procedure Chain of Command

6.1.2 Hazard Identification

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

Table 6-1 Hazards associated with potential emergency situations

Hazard	Emergency Situation
Construction Vehicles: Dump trucks, tractors, excavators, cranes etc.	Collision or overturn which has resulted in operator or third-party injury.
Abrasive wheels/Portable Tools	Entanglement, amputation or electrical shock associated with portable tools.
Contact with services	Electrical shock or gas leak associated with an accidental breach of underground services.
Fire	Injury to operative through exposure to fire.
Falls from heights including falls from scaffold towers, scissor lifts, ladders, roofs and turbines.	Injury to operative after a fall from a height.
Sickness	Illness unrelated to site activities of an operative e.g., heart attack, loss of consciousness, seizure.
Turbine Specific Incident	This will be included when the upon agreement and section of the final turbine type.
Siltation of watercourses, Fuel Management and Spill Control	Run-off to watercourses 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/foghorn that activates an emergency evacuation on the Site. The Site Supervisor/Construction Manager must proceed to the assembly point if the emergency poses any significant threat to their welfare and if there are no injured personnel at the scene that require assistance. The Site Supervisor/Construction Manager will be required to use their own discretion at that point. In the case of fire, the emergency evacuation of the Site should proceed, without exception. The Site evacuation procedure is outlined in Section 6.1.3.
- Make safe the area if possible and ensure that there is no identifiable risk exists with regard to dealing with the situation e.g., if a machine has turned over, ensure that it is in a safe position so as not to endanger others before assisting the injured.
- Contact the required emergency services or delegate the task to someone. If delegating the task, ensure that the procedures for contacting the emergency services as set out in Section 6.3 is followed.
- Take any further steps that are deemed necessary to make safe or contain the emergency incident e.g., cordon off an area where an incident associated with electrical issues has occurred.

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

6.1.3 Site Evacuation/Fire Drill

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

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

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

6.1.4 Spill Control Measures

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

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

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

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

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

6.2 Contacting the Emergency Services

6.2.1 Emergency Communications Procedure

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

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

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

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

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

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

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

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

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

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.

6.3 Contact Details

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

Table 6-2 Emergency Contacts

Contact	Telephone no.
Emergency Services – Ambulance, Fire, Gardaí	999/112
Doctor – Dungarvan Health Centre	05 820 926
Hospital – Dungarvan Community Hospital - Dungarvan	05 841 227
ESB Emergency Services	1800 372 999
Gas Networks Ireland Emergency	1800 20 50 50
Gardaí – Dungarvan Garda Station	05 848 600
Health and Safety Co-ordinator - Health & Safety Services	TBC
Health and Safety Authority	0818 289 389
Inland Fisheries Ireland (IFI)	0818 347 424
Project Supervisor Construction Stage (PSCS): TBC	TBC
Project Supervisor Design Stage (PSDS): TBC	TBC
Client: Slievegrine Ltd.	021 733 6034

6.4 Procedure for Personnel Tracking

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

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

6.5 Induction Checklist

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

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

ERP Items to be included in Site Induction	Status
All personnel will be made aware of the evacuation procedure during site induction	
It may be necessary to liaise with and assist the emergency services on the ground in terms of locating the Site. This may involve providing an escort from a designated meeting point that may be located more easily by the emergency services. This should form part of the site induction to make new personnel and sub-contractors aware of any such arrangement or requirement if applicable.	
All operatives on site without any exception will have undergone 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 are set out in the various sections of the Environmental Impact Assessment Report (EIAR), NIS prepared as part of the planning application to Waterford City & County Council.

This section of the CEMP groups together all of the mitigation measures presented in the above sections. The Mitigation Measures are presented in the following pages and are also outlined within Chapter 18: *'Schedule of Mitigation and Monitoring Measures'*. Decommissioning Phase mitigation measures are not included in the table below, however, can be viewed in Appendix 4-6 (Decommissioning Plan) of the EIAR.

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

Table 7-1 Proposed Mitigation Measures

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
ELAR Chapter 4: 'Description of the Proposed Project'					
Pre-Construction Phase					
MM01	Environmental Management	<i>ELAR Chapter 4</i>	All proposed activities on the Site will be provided for in a CEMP. A CEMP has been prepared for the Proposed Project and is included in Appendix 4-3 of this EIAR. Furthermore, a Surface Water Management Plan (SWMP) has been included as Appendix 4-4 of this EIAR and details the mitigation and monitoring measures for the protection of surface water features within the Site. The CEMP sets out the key environmental considerations to be considered by the contractor during construction of the Proposed Project. The CEMP includes details of drainage, spoil management and waste management, and details the mitigation and monitoring measures to be implemented in order to comply with the environmental commitments outlined in the EIAR. The contractor will be contractually obliged to comply with all such measures. In the event planning permission is granted for the Proposed Project, the CEMP will be updated prior to the commencement of the development, to address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned and will be submitted to the Planning Authority for approval.		
MM02	Health and Safety	<i>ELAR Chapter 4, Chapter 5</i> <i>Appendix 4-3</i>	The Proposed Project will be constructed, operated and decommissioned in accordance with all relevant Health and Safety Legislation, including: ➤ Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005);		

			➤ Safety, Health and Welfare at Work (General Application) (Amendment) Regulations 2016 (S.I. No. 36 of 2016); ➤ S.I. No. 528/2021 - Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021; and, ➤ Safety, Health and Welfare at Work (Work at Height) Regulations 2006 (S.I. No. 318 of 2006). 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 over the Site. All staff will be trained to be aware of the risks associated with overhead lines. All contractors that may visit the Site will be made aware of the location of overhead electricity 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		
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			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 ➤ 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 Health and Safety Plan.		
MM03	Environmental Management	<i>Appendix 4-3</i>	The Project Developer will be required to engage a qualified Environmental Engineer, Environmental Scientist, Ecologist, 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 ECoW will have experience relating to freshwater pearl mussel will be appointed to the Site to oversee works in proximity to the River Licky. 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.		
MM04	Waste Management	<i>Chapter 4: 'Description of the Proposed Project'</i>	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 (WMP), ensuring that all hired waste contractors have the necessary permits/licenses and 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 WMP. 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.		
MM05	Site Drainage Plan	Appendix 4-4	The Project Hydrologist will complete a detailed drainage design and maintenance plan before construction commences and will attend the Site to set out the proposed drainage controls as outlined in Section 4.6.7 4.in Chapter 4: 'Description of the Proposed Project' of the EIAR. The drainage system will be excavated and constructed in conjunction with the road and hard standing construction. A network of drains already exist, and these will be integrated and enhanced as required and used within the Proposed Project drainage system. These existing drains will continue to function as they are during the pre-construction phase. Prior to commencement of works in sub-catchments across the Site, drain inspections will be completed to ensure ditches and streams are free from debris and blockages that may impede drainage. These inspections will be done on a catchment-by-catchment basis as the construction works develop across the Site, as works in all areas will not commence simultaneously.		
MM06	Pre-Construction Drainage	Chapter 4 Appendix 4-3 Appendix 4-4	Drainage and associated pollution control measures will be implemented onsite before the main construction works commence. Where possible drainage controls will be installed during seasonally dry ground conditions. This will reduce the possibility of impact on surface waters by suspended sediment released during construction and entrained in surface run-off. The routes of any natural drainage features will not be altered as part of the Proposed Project. Turbine locations have been selected to avoid natural watercourses. There will be		

			no direct discharges to natural watercourses. All discharges from the proposed works areas or from interceptor drains will be made over vegetated ground at an appropriate distance from watercourses.		
MM07	Tree Felling Drainage	<i>Chapter 4: 'Description of the Proposed Project'</i>	The ECoW shall be experienced and competent, and shall have the following functions and operate their record using a Schedule of Works Operation Record (SOWOR), as proposed in the planning application: ➤ Attend the Site for the setup period when drainage protection works are being installed and be present onsite during the remainder of the forestry keyhole felling works. ➤ Prior to the commencement of works, review and agreement of the positioning by the Operator of the required Aquatic Buffer Zones (ABZs), silt traps, silt fencing (see MM23), water crossings and onsite storage facilities for fuel, oil and chemicals. ➤ Be responsible for preparing and delivering the environmental tool box talk to all relevant parties involved in site operations, prior to the commencement of the works. Also, prior to the commencement of tree felling for subsequent road construction the following key temporary drainage measures will be installed: ➤ All existing dry forestry drains that intercept the proposed works area will be temporarily blocked down-gradient of the works using forestry check dams/silt traps; ➤ Clean water diversion drains will be installed upgradient of the works areas; ➤ Check dams/silt fence arrangements (silt traps) will be placed in all existing forestry drains that have surface water flows and also along existing forestry roadside drains; and, ➤ A double silt fence perimeter will be placed down-slope of works areas that are located inside the watercourse 50m buffer zone. ➤ Prepare and maintain a contingency plan. ➤ Suspend work where potential risk to water from siltation and pollution is identified, or where operational methods and mitigation measures are not specified or agreed. ➤ Prepare and maintain a Water Protection Measure Register. This document is to be updated weekly by the ECoW.		

MM08	Existing Underground Services	<i>Chapter 4</i> <i>Appendix 4-3</i>	Prior to beginning construction work the contractor will scan the Proposed 110kV Underground Route with a Cable Avoidance Tool (CAT), carry out visual inspection of the area and may carry out further below ground surveys if deemed necessary. If any previously unidentified services are discovered the site engineer will inform the design of the issues and possibly recommend a solution that works with the new constraints. If found to be present, the relevant service provider will be consulted with in order to determine the requirement for specific excavation or relocation methods and to schedule a suitable time to carry out works. If existing low voltage underground cables are found to be present, a trench will be excavated, and new ducting and cabling will be installed along the new alignment and connected to the network on either end. The trench will be backfilled with suitable material to the required specification. Warning strip and marking tape will be laid at various depths over the cables as required. Marker posts and plates will be installed at surface level to identify the new alignment of the underground cable, the underground cables will then be energised. Whilst the Proposed 110kV Underground Cabling Route is not predicted to interact with Uisce Éireann assets, should it not be possible to be cross and water main by undercrossing or overcrossing, the water supply will be turned off by the utility so work can commence on diverting the service. The section of existing pipe will be removed and will be replaced with a new pipe along the new alignment of the service. The works will be carried out in accordance with the utility standards.		
MM09	Traffic Management	<i>Chapter 4,</i> <i>Chapter 15</i> <i>Appendix 4-3</i> <i>Appendix 15-3</i>	A detailed Traffic Management Plan (TMP) will be provided specifying details relating to traffic management and included in the CEMP prior to the commencement of the construction phase of the Proposed Project. The TMP will be agreed with the local authority and An Garda Síochána prior to construction works commencing on-site. The TMP will include: ➤ A delivery schedule.		

			➤ Details of works or any other minor alteration identified. ➤ A dry run of the route using vehicles with similar dimensions.		
MM10	Invasive Species Management	<i>ELAR Appendix 4-3</i>	A pre-commencement survey for invasive species within the footprint of the Proposed Wind Farm site will be carried out by a suitably qualified ecologist to ensure there is no new growth of Third Schedule invasive species in these areas.		
MM11	Archaeological Management	<i>ELAR Appendix 4-3</i>	Pre-development testing, under licence from the National Monument Service (NMS), will be carried out. Testing will only be undertaken in areas where ground disturbance will take place as part of the Proposed Project. The areas to be tested will be chosen by the appointed archaeologist and the number of test trenches agreed between the archaeologist and the NMS through the licensing system. A report on the testing will be compiled on completion of the work. Should archaeological finds, structures or deposits be uncovered as a result of the testing further mitigation measures such as preservation in situ or preservation by record (excavation) may be required and will be decided in consultation with the NMS.		
Construction Phase					
MM12	Proposed Drainage Management	<i>Appendix 4-4:</i>	➤ Runoff control and drainage management are key elements in terms of mitigation against impacts on surface water bodies. Two distinct methods will be employed to manage drainage water within the Site. ➤ The first method involves 'keeping clean water clean' by avoiding disturbance to natural drainage features, minimising any works in or around artificial drainage features, and diverting clean surface water flow around excavations, 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 stilling ponds (MM16) 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.		

MM13	Interceptor Drain	<i>Chapter 4:</i> <i>Appendix 4-4:</i>	➤ Interceptor drains will be installed upgradient of any works areas to collect surface flow runoff and prevent it reaching excavations and construction areas of the Site where it might otherwise have come into contact with exposed surfaces and picked up silt and sediment. The drains will be used to divert upslope runoff around the works area to a location where it can be redistributed over the ground surface as sheet flow. This will minimise the volume of potentially silty runoff to be managed within the construction area. ➤ The interceptor drains will be installed in advance of any main construction works commencing. ➤ On completion of the construction phase works, it is envisaged that the majority of the interceptor drains could be removed. At that stage, there will be no open excavations or large areas of exposed ground that are likely to give rise to large volumes of potentially silt-laden run off. Any areas in which works were carried out to construct roads, turbines or hardstands, will have been built up with large grade hardcore, which even when compacted in place, will retain sufficient void space to allow water to infiltrate the subsurface of these constructed areas. ➤ Where the drains are to be removed, they will be backfilled with the material from the diversion dike. ➤ Interceptor drains may have to be retained in certain locations, for example where roadways are to be installed on slopes, to prevent the roadways acting as conduits for water that might infiltrate the roadway sub-base. In these cases, interceptor drains would be maintained in localised areas along the roadway with culverts under the roadway, which would allow the intercepted water to be discharged to vegetation filters downgradient of the roadway. Similarly, in localised hollows where water is likely to be funnelled at greater concentrations than on broader slopes, interceptor drains and culverts may be left in situ following construction. ➤ The velocity of flow in the interceptor will be controlled by check dams (MM15), which will be installed at regular intervals along the drains to ensure flow in the channel is non-erosive. ➤ Intercepted water will travel along the interceptor drains to areas downgradient of works areas, where the drain will terminate at a level spreader (MM17).		
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MM14	Swales	<i>Chapter 4:</i> <i>Appendix 4-4:</i>	➤ Drainage swales are shallow drains that will be used to intercept and collect run off from construction areas of the Site during the construction phase. Drainage swales will remain in place to collect runoff from roads and hardstanding areas of the Proposed Project during the operational phase. ➤ Drainage swales will be installed downgradient of any works areas to collect surface flow runoff where it might have come into contact with exposed surfaces and picked up silt and sediment. Swales will intercept the potentially silt-laden water from the excavations and construction areas of the Site and prevent it reaching natural watercourses prior to treatment. ➤ Drainage swales will be installed in advance of any main construction works commencing. The material excavated to make the swale will be compacted on the downslope edge of the drain to form a diversion dike.		
MM15	Check Dams	<i>Chapter 4:</i> <i>Appendix 4-4:</i>	➤ 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 swale is non-erosive. ➤ 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. Check dams may also be installed in some of the existing artificial drainage channels on the Site, downstream of where drainage swales connect in. ➤ The proposed check dams will be made up of stone. ➤ 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. ➤ Check dams will not be used in any natural watercourses, only artificial drainage channels and interceptor drains. The check dams will be left in place at the end of the construction phase to limit erosive linear flow in the drainage swales during extreme rainfall events. ➤ If necessary, any excess sediment build up behind the dams will be removed. For this reason, check dams will be inspected and maintained regularly to insure adequate		

			performance. Maintenance checks will also ensure the centre elevation of the dam remains lower than the sides of the dam.		
MM16	Stilling Ponds (Settlement Ponds)	<i>Chapter 4: Appendix 4-4:</i>	➤ Stilling ponds will be used to attenuate runoff from works areas of the Site during the construction phase and will remain in place to handle runoff from roads and hardstanding areas of the Proposed Project during the operational phase. ➤ Reducing runoff velocity will allow larger particles to settle out in the stilling ponds, before the run-off water is redistributed as diffuse sheet flow in filter strips downgradient of any works areas. ➤ Stilling ponds will be excavated/constructed at each required location as two separate ponds in sequence, a primary pond and a secondary pond. The points at which water enters and exits the stilling ponds will be stabilised with rock aprons, which will trap sediment, dissipate the energy of the water flowing through the stilling pond system, and prevent erosion. ➤ Stilling ponds will be located towards the end of swales, close to where the water will be reconverted to diffuse sheet flow. Upon exiting the stilling pond system, water will be immediately reconverted to diffuse flow via a fan-shaped rock apron if there is adequate space and ground conditions allow. Otherwise, a swale will be used to carry water exiting the stilling pond system to a level spreader to reconvert the flow to diffuse sheet flow. ➤ Stilling ponds will be inspected weekly and following rainfall events. Inlet and outlets will be checked for sediment accumulation and anything else that might interfere with flows.		
MM17	Level Spreaders	<i>Chapter 4: Appendix 4-4:</i>	➤ A level spreader will be constructed at the end of each interceptor drain to convert concentrated flows in the drain, into diffuse sheet flow on areas of vegetated ground. The levels spreaders will be located downgradient of any proposed works areas in locations where they are not likely to contribute further to water ingress to construction areas of the Site. ➤ The level spreaders will distribute clean drainage water onto vegetated areas where the water will not be reconcentrated into a flow channel immediately below the point of discharge. The discharge point will be on level or only very gently sloping ground rather than on a steep slope so as to prevent erosion.		

MM18	Piped Slope Drains	Chapter 4: Appendix 4-4:	- Piped slope drains will be used to convey surface runoff from diversion drains safely down slopes to flat areas without causing erosion. Once the runoff reaches the flat areas it will be reconverted to diffuse sheet flow. Level spreaders will only be established on slopes of less than 6% in grade. Piped slope drains will be used to transfer water away from areas where slopes are too steep to use level spreaders. - The piped slope drains will be semi-rigid corrugated pipes with a stabilised entrance and a rock apron at the outlet to trap sediment and dissipate the energy of the water. - Piped slope drains will only remain in place for the duration of the construction phase of the Proposed Project. On completion of the works, the pipes and rock aprons will be removed, and all channels backfilled with the material that was originally excavated from them. - Piped slope drains will be inspected weekly and following rainfall events. Inlet and outlets will be checked for sediment accumulation and blockages. Stake anchors or fill over the pipe will be checked for settlement, cracking and stability. Any seepage holes where pipe emerges from drain at the top of the pipe will be repaired promptly.		
MM19	Vegetation Filters	Chapter 4: Appendix 4-4:	- Vegetation filters will carry outflow from the level spreaders as overland sheet flow, removing any suspended solids and discharging to the groundwater system by diffuse infiltration. - Vegetation filters will not be used in isolation for waters that are likely to have higher silt loadings.		
MM20	Silt bags	Chapter 4:	- Dewatering silt bags allow the flow of water through them while trapping any silt or sediment suspended in the water. The silt bags provide a passive non-mechanical method of removing any remaining silt contained in the potentially silt-laden water collected from works areas within the Site. - Dewatering silt bags are an additional drainage measure that can be used downgradient of the stilling ponds at the end of the drainage swale channels and will be located, wherever it is deemed appropriate, throughout the Site. The water will flow, via a pipe, from the stilling ponds into the silt bag. The silt bag will allow the water to flow through the geotextile fabric and will trap any of the finer silt and sediment remaining in the water after it has gone through the previous drainage		

			measures. The dewatering silt bags will ensure that there will be no loss of silt into the stream. ➤ The dewatering silt bag that will be used will be approximately 3 metres in width by 4.5 metres in length and will be capable of trapping approximately four tonnes of silt. The dewatering silt bag, when full, will be removed from Site by a waste contractor with the necessary waste collection permit, who will then transport the silt bag to an appropriate, fully licensed waste facility.		
MM21	Sedimats	Chapter 4: Appendix 4-4:	➤ Sediment entrapment mats, consisting of coir or jute matting, will be placed at the outlet of the silt bag to provide further treatment of the water outfall from the silt bag. ➤ Sedimats will be secured to the ground surface using stakes/pegs. ➤ The sedimat will extend to the full width of the outfall to ensure all water passes through this additional treatment measure.		
MM22	Culverts	Chapter 4: Appendix 4-4:	➤ All new proposed culverts and proposed culvert upgrades at forestry drain crossings, will be suitably sized (approx. 900mm) for the expected peak flows in the relevant drain. ➤ Some culverts may be installed to manage drainage waters from works areas of the Proposed Project, particularly where the waters have to be taken from one side of an existing roadway to the other for discharge. The size of culverts will be influenced by the depth of the track or road sub-base. In some cases, two or more smaller diameter culverts may be used where this depth is limited, though this will be avoided as they will have a higher associated risk of blockage than a single, larger pipe. In all cases, culverts will be oversized to allow mammals to pass through the culvert. ➤ Depending on the management of water on the downstream side of the culvert, a large stone may be used to interrupt the flow of water. This will help dissipate its energy and help prevent problems of erosion. ➤ Smaller water crossings will simply consist of an appropriately sized pipe buried in the sub-base of the road at the necessary invert level to ensure ponding or pooling does not occur above or below the culvert and water can continue to flow as necessary.		

MM23	Silt Fences	Chapter 4: Appendix 4-4:	➤ Silt fences will be installed as an additional water protection measure around existing watercourses in certain locations, particularly where works are proposed within the 50-metre buffer zone of a stream. ➤ Silt fences will be installed as single, double or a series of triple silt fences, depending on the space available and the anticipated sediment loading. The silt fence designs follow the technical guidance document ‘Control of Water Pollution from Linear Construction Projects’ published by Construction Industry Research and Information Association (CIRIA, No. C648, 1996). Up to three silt fences may be deployed in series. ➤ All silt fencing will be formed using Terrastop Premium or equivalent silt fence product. ➤ Silt fences will be inspected regularly to ensure water is continuing to flow through the fabric, and the fence is not coming under strain from water backing up behind it.		
MM24	Oil Interceptor	Chapter 4: Appendix 4-4:	➤ A suitably sized hydrocarbon interceptor will be installed wherever it is intended to store hydrocarbons and oils (i.e., construction compounds and substation compounds).		
MM25	Cable Trench Drainage	Appendix 4-4:	➤ Cable trenches are typically constructed in short, controlled sections, thereby minimising the amount of ground disturbed at any one time and minimising the potential for drainage runoff to pick up silt or suspended solids. Each short section of trench is excavated, ducting installed and bedded, and backfilled with the appropriate materials, before work on the next section commences. ➤ To efficiently control drainage runoff from cable trench works areas, excavated material is stored on the up-gradient side of the trench and is temporarily sealed/smoothed over, using the back of the excavator bucket. ➤ Should any rainfall cause runoff from the excavated material, the material is therefore collected and contained in the downgradient cable trench. Excess subsoil is removed from the cable trench works area immediately upon excavation, and in the case of the Proposed Project, would be transported to one of the on-site borrow pits or used for landscaping and reinstatement of other areas elsewhere on-site.		

			On steeper slopes, silt fences, as detailed in MM23, 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.		
MM26	Reactive Site Drainage Management	Appendix 4-4:	- 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 ECoW or supervising hydrologist will respond to changing weather, ground or drainage conditions on the ground as the project proceeds, to ensure the effectiveness of the drainage design is maintained in so far as is possible. - 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 set out in MM06–MM19 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 set out in MM06–MM19 will be installed in advance of works recommencing.		
MM27	Refuelling, Fuel, Spills, Leaks and Hazardous Materials Storage	Appendix 4-4:	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 in the construction compound 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. The following mitigation measures are proposed to avoid release of hydrocarbons at the Site: ➤ The highest standards of site management will be maintained, with the utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the Site and surrounding environment during construction; ➤ An Emergency Response Plan for accidental spillages will be implemented as part of the CEMP. All construction staff will be familiar with the emergency procedures and the use of the relevant equipment; ➤ The ECoW will oversee the pollution prevention measures agreed for the Site to ensure that they are operating safely and effectively as well as having responsibility for the implementation of Emergency Procedures for spill control measures. ➤ Where possible, refuelling will occur at an off-site controlled fuelling station. ➤ Refuelling will be undertaken by designated, suitably trained personnel only; ➤ Refuelling of construction machinery will take place using drip trays at all times; ➤ All plant and machinery will be serviced before being mobilised to site and will be regularly inspected and maintained to minimise the risk of leaks and spillages; ➤ Maintenance of construction vehicles or plant will, where practicable, be undertaken off site; ➤ Spill response kits will be available at all active work areas, refuelling locations, concrete works and construction compounds, and personnel will be trained in their use; ➤ Fuels stored on-site will be minimised. Storage areas, where required, will be bunded appropriately for 110% of the fuel storage volume for the time period of construction and fitted with a storm drainage system and an appropriate oil interceptor; ➤ All waste tar material arising from the excavation of the 110kV underground cabling trench and resurfacing of roads will be removed off-site and taken to a licenced waste facility;		
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			➤ An Emergency Response Plan for accidental spillages will be implemented as part of the CEMP. All construction staff will be familiar with the emergency procedures and the use of the relevant equipment; ➤ Emergency Response PlanHydrocarbon interceptors will be installed at the substations and construction compounds where hydrocarbons are stored.		
MM28	Concrete Deliveries	Appendix 4-4:	➤ 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. Concrete trucks 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 equivalent. This type of water treatment 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. ➤ The areas are covered when not in use to prevent rainwater collecting. In periods of dry weather, the areas can be uncovered to allow much of the water to be lost to evaporation. At the end of the concrete pours, any of the remaining liquid contents will be tankered off-site to an appropriately authorised facility as necessary. Any residual solid contents that will have been cleaned down from the chute will have solidified and can be broken up and disposed of along with other construction waste by an appropriately authorised waste collector for disposal at an authorised waste facility. ➤ The risks of pollution arising from concrete deliveries will be further reduced by the following:		

			➤ Site roads will initially be constructed with a subgrade and compacted with the use of a roller to allow concrete delivery trucks access all areas where the concrete will be needed. The final wearing course for the Site roads will not be provided until all bases have been poured. ○ No concrete will be transported around the Site in open trailers or dumpers so as to avoid spillage while in transport. All concrete used in the construction of turbine 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 at the Site.		
MM29	Concrete Pouring	<i>Appendix 4-4:</i>	Specific procedures will be adopted in advance of and during all concrete pours to minimise the risk of pollution. These will include: ➤ Using weather forecasting to assist in planning large concrete pours and avoiding large pours where prolonged periods of heavy rain is forecast. ➤ Restricting concrete pumps and machine buckets from slewing over watercourses (including drains and ditches) while placing concrete. ➤ Ensuring that excavations are sufficiently dewatered before concreting begins and that dewatering continues while concrete sets. ➤ Ensuring that covers are available, and used, when necessary, for freshly placed concrete to avoid the surface washing away in heavy rain. ➤ The small volume of water that will be generated from washing of the concrete lorry's chute will be directed into a temporary lined impermeable containment area, or equivalent.		

MM30	Public Road Cleanliness	Appendix 4-4:	➤ A road sweeper will be available if any section of the public roads requires cleaning due to construction traffic associated with the Proposed Project.		
MM31	Spoil Management Strategy and Placement of Spoil	ELAR Chapter 4 Appendix 4-3 Appendix 4-4	The following recommendations and best practice guidelines for the placement of spoil will be adhered to during the construction of the Proposed Project: ➤ The landscaping areas will be developed in a phased approach, with the spoil being removed and temporarily stockpiled while the borrow pits are extracted. The stockpiled spoil will be deposited into the void borrow pits upon completion of extraction activities and the exercise will continue within the void until it cannot accommodate any further spoil. ➤ Stockpiles of excavated spoil will not be placed within the stockpile exclusion area, as outlined in Figure 4-43 of Chapter 4 of the ELAR. ➤ The material will be backfilled into the void borrow pits and landscaping areas and will be spread evenly across the area. ➤ Stockpiles 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 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. ➤ Inspections of the temporary stockpiles, reinstated borrow pits and landscaping areas will be made by a Geotechnical Engineer through regular monitoring of the works. The appointed contractor will review work practices at these areas when periods of heavy rainfall are expected so as to prevent excessive dirty water runoff from being generated. ➤ 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.		

MM32	Dewatering and Borrow Pit Drainage	<i>Appendix 4-4:</i>	Pumping of water from excavations will be necessary, so localised and temporary groundwater lowering cannot be avoided if or where it is implemented. Quantities will be small given the generally low-permeability characteristics of both the till and the bedrock groundwater flow system. Additionally, excavations will remain relatively shallow and most turbine bases and proposed borrow pits are located in elevated areas near hilltops. Pumping and water management is a matter of routine for contractors familiar with this type of development and activity. No direct discharges to streams will be permitted, and this will be enforced by the ECoW. All pumped water must be led and pass through a suitably sized settling basin prior to diffuse discharge to ground or a drain away from the excavation location. Other relevant measures are: ➤ Interceptor drains will be established around the perimeter of borrow pits. These drains will divert any surface water away from the borrow pits and hence prevent water from ponding and lodging during construction (and also when reinstated). ➤ Stilling ponds have been designed at the lower side/outfall location of the borrow pits.		
MM33	Wastewater Management	<i>ELAR Chapter 4</i> <i>Appendix 4-3</i>	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.		
MM34	Dust Suppression	<i>ELAR Chapter 4</i> <i>ELAR Appendix 4-3</i>	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 required within the Site, to prevent dust from becoming a nuisance. If necessary, water will be taken from stilling/settlement ponds in the drainage system and will be pumped into a bowser or water spreader to dampen down haul roads and 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. ➤ Areas of excavation will be kept to a minimum, and stockpiling will be minimised by coordinating excavation, spreading and compaction. ➤ Construction traffic will use 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 for damage/potholes and repaired as necessary. ➤ The transportation of materials from the borrow pit around the Site will be covered by tarpaulin or similar covered vehicles where necessary. ➤ Any required transportation of construction materials from locally sourced quarries to the Site will be covered by tarpaulin where necessary. ➤ If necessary, excavated material will be dampened prior to transport to the borrow pits. ➤ Waste material will be transferred to a licensed/permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF facility will be		
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			local to the Proposed Project to reduce the level of emissions associated with vehicle movement.		
MM35	Noise Control	<i>ELAR Appendix 4-3</i>	The contract documents will specify that the contractor undertaking the construction works will be obliged to adopt best practice noise abatement measures contained in British Standard BS 5228-1:2009+A1:2014 ‘Code of practice for noise and vibration control on construction and open sites – Noise’ and BS 5228-2:2009+A1:2014 ‘Code of practice for noise and vibration control on construction and open sites – Vibration’. The following best practice mitigation measures from these documents will be implemented as required for the duration of the construction and decommissioning phases: ➤ Limiting the hours during which site activities likely to create high levels of noise or vibration are permitted; ➤ Establishing channels of communication between the contractor/developer, Local Authority and residents; ➤ Monitoring typical levels of noise and vibration during critical periods and at sensitive locations; ➤ Selection of plant with low inherent potential for generation of noise and/ or vibration where practical; ➤ Placing of noise generating / vibratory plant as far away from sensitive receptors as practical within the site constraints, and; ➤ The hours of construction activity will be limited to avoid unsociable hours where possible. Works operations shall generally be restricted to between 7:00hrs and 19:00hrs Monday to Saturday. However, to ensure that optimal use is made of good weather periods or at critical periods within the programme (i.e. concrete pours, turbine component deliveries) it could occasionally be necessary to work out of these hours. ➤ The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations. ➤ Compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers.		

			➤ Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use. ➤ Any plant, such as generators or pumps, which is required to operate outside of general construction hours will be surrounded by an acoustic enclosure or portable screen as appropriate. ➤ The findings of the assessment confirmed that the predicted operational noise levels from the Site will be within the relevant best practice noise criteria for the detailed potential turbine specification. Therefore, no specific mitigation measures are required. ➤ In the unlikely event that an issue with low frequency noise is associated with the Proposed Project, it is recommended that an appropriate detailed investigation be undertaken. Due consideration should be given to guidance on conducting such an investigation which is outlined in Appendix VI of the EPA document entitled 'Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities' (NG4) (EPA, 2016). This guidance is based on the threshold values outlined in the Salford University document 'Procedure for the assessment of low frequency noise complaints, Revision 1, December 2011'.		
MM36	Invasive Species Management	Appendix 4-3:	The following measures will be in place to avoid impacts to biosecurity as a result of construction of the Proposed Project: Rhododendron regrows vigorously when cut. As a result, some method of stump killing or removal is always necessary. Any untreated cut stump will regrow and in most cases flower within 3-4 years. The following site hygiene and biosecurity measures will be adhered to for the management of invasive species within the Site: ➤ All works in relation to the invasive species will be supervised by an ECoW. ➤ All staff will be given a tool box talk, by a suitably qualified person or ecologist, on invasive species removal in relation to Rhododendron (or any other identified Invasive Species, should they recorded) and its management on site. ➤ The contractor will assign a member of their team as Environmental Officer to ensure the management plan is adhered to throughout the proposed works. ➤ A designated bio-secure area/exclusion zone will be set up at recorded invasive species locations to prevent disturbance in these areas. Invasive species will be marked with		

			hazard tape in order to identify the species prior to vegetation clearance works and to keep it separate from other brash material. ➤ All machinery should be thoroughly cleaned down prior to arriving on the Site to avoid the potential spread of invasive species from elsewhere. ➤ Machinery that is used for excavation and onsite removal of invasive material will not be used for any other works until they are fully cleaned down and then visually inspected by a specialist to ensure no fragments of invasive plant material are present. ➤ Prior to leaving the invasive species exclusion zones, all boots and clothing will be thoroughly brushed down to remove any contaminated material prior to leaving the area. ➤ As a precautionary measure, machinery will be thoroughly cleaned down before exiting the Site to prevent potential spread of invasive species elsewhere. ➤ Clean down will be carried out using brushes and shovels and power washing will be avoided insofar as possible. This is to prevent potentially contaminated run-off spreading outside the Site. ➤ Material used for tracking machinery out of the contaminated areas onsite e.g. plywood will be thoroughly cleaned down under supervision of the ECoW prior to removal off site. ➤ Any soil and topsoil required on the Site will be sourced from a stock that has been screened for the presence of any invasive species and where it is confirmed that none are present. Construction Management Measures ➤ Prior to the commencement of any works, the following site setup procedures will be carried out: ➤ A pre-commencement survey for Rhododendron and any other invasive species will be undertaken by a fully qualified ecologist to determine the locations and extent of the species within the Proposed Wind Farm and to determine whether there have been any changes in the extent of the infestation since the undertaking of the baseline surveys.		
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			> The locations and extent of Rhododendron (or any other invasive species) within the Proposed Wind Farm will be clearly marked out using hazard tape to ensure they are not disturbed. > For Rhododendron stands that occur outside of the permanent built infrastructure footprint and will not be directly impacted, a 10m buffer zone (Higgins, G.T. 2008) surrounding each stand will also be applied using temporary fencing, to avoid disturbance of potentially contaminated soils. Due to the young age and small size of the infestations recorded within the Proposed Wind Farm, it is proposed to treat the plant in-situ. The recommended option for in-situ treatment is to manually remove the upper parts of the plant and apply the Ecoplug method (Willoughby et al. 2017) as to avoid spray drift and to minimise the potential for spraying of non-target species. An Ecoplug is a sealed plastic capsule containing a measured dose of granular glyphosate herbicide. The capsule is inserted into a drilled hole in a freshly cut tree stump and hammered into place. Once activated, the glyphosate is released into the stump's vascular system and transported throughout the stump and root system, killing the tree and preventing regrowth. The Ecoplug method is outlined below. > Cut the tree/plant as close to the ground as possible. > The cut material can be stacked and stored onsite, used as firewood or mulched. > A 30 mm hole will be drilled into the remaining stump and the Ecoplug will be inserted into the hole until it is flush with the top of the stump. > Where immature plants occur, hand pulling can be undertaken at any time of the year and left to dry out on an impermeable surface. Where the Ecoplug method is unsatisfactory or where the plant requires removal due to being present within the permanent built infrastructure footprint, physical extraction of the root/stump from the ground will be carried out. > Cut the tree/plant as close to the ground as possible. > The root/stump will be removed from the ground using hand tool or an excavator. > The cut material can be stacked and stored within the Proposed Wind Farm, used as firewood or mulched.		
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			➤ The root/stump will be placed on an impermeable surface such as palettes or a radon barrier membrane and left to dry out. Following treatment or eradication of the plant, excavated soil from the Site of infestations at the Proposed Wind Farm will still be considered to be contaminated on a precautionary basis. In order to avoid the potential spread of the species, the top layer of soil from the 10m buffer zone will be removed and transported to an offsite waste facility, under license from the NPWS.		
MM37	Waste Management	<i>ELAR Chapter 4</i> <i>Appendix 4-3</i>	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 the 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. 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 Proposed 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. 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.		
MM38	Emergency Response	Appendix 4-3:	In the event of an emergency situation the Site Supervisor/Construction Manager will carry out the following: ➤ Establish the scale of the emergency situation and identify the number of personnel, if any, have been injured or are at risk of injury. ➤ Where necessary, sound the emergency siren/foghorn that activates an emergency evacuation on the Site. The Site Supervisor/Construction Manager must proceed to the assembly point if the emergency poses any significant threat to their welfare and if there are no injured personnel at the scene that require assistance. The Site Supervisor/Construction Manager will be required to use their own discretion at that point. In the case of fire, the emergency evacuation of the Site should proceed, without exception. The Site evacuation procedure is outlined in Section 6.1.3 of Appendix 4-3: CEMP.		

			➤ 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 of Appendix 4-3: CEMP 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 ➤ Contact the next of kin of any injured personnel where appropriate.		
MM39	Site Evacuation/Fire Drill	ELAR Appendix 4-3	A site evacuation/fire drill procedure will provide basis for carrying out the immediate evacuation of all site personnel in the event of an emergency. The following steps will be taken: ➤ Notification of the emergency situation. Provision of a siren or foghorn to notify all personnel of an emergency situation. ➤ An assembly point will be designated in the construction compound area and will be marked with a sign. All site personnel will assemble at this point. ➤ A roll call will be carried out by the Site Security Officer to account for all personnel on site. ➤ The Site Security Officer will inform the Site Supervisor/Construction Manager when all personnel have been accounted for. The Site Supervisor/Construction Manager will decide the next course of action, which be determined by the situation that exists at that time and will advise all personnel accordingly. All personnel will be made aware of the evacuation procedure during site induction. The Fire Services Acts of 1981 and 2003 require the holding of fire safety evacuation drills at specified intervals and the keeping of records of such drills.		

MM40	Spill Control measures	Appendix 4-3:	Oil/fuel spillages are one of the main environmental risks that will exist on the Site which will require an emergency response procedure. The following steps provide the procedure to be followed in the event of such an incident: ➤ Stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers. ➤ If applicable, eliminate any sources of ignition in the immediate vicinity of the incident. ➤ Contain the spill using the spill control materials, track mats or other material as required. Do not spread or flush away the spill. ➤ If possible, cover or bund off any vulnerable areas where appropriate such as drains, watercourses or sensitive habitats. ➤ If possible, clean up as much as possible using the spill control materials. ➤ Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited. ➤ Notify the ECoW immediately giving information on the location, type and extent of the spill so that they can take appropriate action. ➤ The ECoW will inspect the Site and will assist by providing any advice possible to ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring. ➤ The Construction Manager will notify the appropriate regulatory body such as Waterford City & County Council, Inland Fisheries Ireland (IFI), National Parks and Wildlife Service (NPWS), etc. if deemed necessary. The importance of a swift and effective response in the event of such an incident occurring cannot be over emphasised. Environmental incidents are not limited to just fuel spillages. Therefore, any environmental incident must be investigated in accordance with the following steps. ➤ The ECoW must be immediately notified.		
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			➤ The details of the incident will be recorded on an Environmental Incident Form which will provide information such as the cause, extent, actions and remedial measures used following the incident. The form will also include any recommendations made to avoid reoccurrence of the incident. ➤ If the incident has impacted on an ecologically sensitive receptor, such as a sensitive habitat, protected species or designated conservation site (pSPA or cSAC), the ECoW will liaise with the Project Ecologist. ➤ If the incident has impacted on a sensitive receptor such as an archaeological feature the ECoW will liaise with the Project Archaeologist. ➤ A record of all environmental incidents will be kept on file by the ECoW and the Project Contractor. These records will be made available to the relevant authorities such as Waterford City & County Council, IFI, NPWS, etc. if required. The ECoW will be responsible for any corrective actions required as a result of the incident e.g. an investigative report, formulation of alternative construction methods or environmental sampling, and will advise the Project Contractor as appropriate.		
EIAR Chapter 5: 'Population and Human Health'					
Pre-Commencement Phase					
MM54	Mitigation by Design	<i>Chapter 5:</i>	The Proposed Wind Farm has been designed in accordance with the parameters set out in the Guidelines (DoEHLG, 2006) and with cognisance of the Draft Guidelines (DoHPLG, 2019), adhering to the required setback distances from sensitive receptors set out in those documents.		
MM55	Major Accidents and Natural Disasters	<i>Chapter 5:</i>	➤ The Proposed Project will be designed and built in line with current best practice and, as such, mitigation against the risk of major accidents and/or disasters will be embedded through the design. In accordance with the provision of the European Commission 'Guidance on the preparation of Environmental Impact Assessment Reports' 2017, a Risk Management Plan will be prepared and implemented onsite to ensure an effective response to disasters or the risk of accidents. The plan will include sufficient preparedness and emergency planning measures.		

			➤ The Proposed Project will also be subject to a fire safety risk assessment in accordance with Chapter 19 of the Safety, Health and Welfare at Work Acts 2005 to 2014, which will assist in the identification of any major risks of fire onsite, and mitigation of the same during operation.		
MM56	Notification of Works	<i>Chapter 5:</i> <i>Appendix 15-3</i>	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					
MM57	Land Use Activities and Patterns	<i>Chapter 5:</i>	➤ The Proposed Project has been designed to minimise permanent land-take by optimising the location of turbines and associated infrastructure and, where practicable, utilising existing forestry tracks and disturbed areas. ➤ The Proposed 110kV Underground Cabling Route will be installed predominantly within the existing public road corridor, thereby reducing the requirement for permanent occupation of previously undeveloped land. ➤ Construction compounds, working areas and cable installation corridors will be reinstated following completion of the works. Borrow pit voids will be progressively backfilled with suitable excavated spoil and subsequently reseeded or allowed to revegetate naturally.		
MM58	Health	<i>Chapter 5:</i> <i>Appendix 4-3:</i>	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). Furthermore: ➤ 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 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 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.		
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			➤ Signage indicating locations and health and safety measures regarding overhead lines will be erected in canteens and on Site. ➤ Goal posts will be established, where necessary, under overhead electricity lines for the entirety of the construction phase of the Proposed Wind Farm. Specifically, the construction of the Proposed 110kV Underground Cabling Route will be in phases along the Proposed 110kV Underground Cabling Route. Prior to commencing grid connection works in the agricultural fields in the townland of Ballycullane and Graigue, goal posts will be established under the 220kV overhead line and remain in place for the duration of the works in this area. The goal posts will not exceed a height of 4.2 metres, unless specifically agreed with ESB Networks. ➤ 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 <i>'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2013'</i>. 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		
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			➤ 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.		
ELAR Chapter 6: 'Biodiversity'					
Construction Phase					

MM64	Potential Effects on Treeline Hedgerow Stonewall	<i>Chapter 6: Appendix 6-4:</i>	In order to offset the loss of linear vegetation, up to 5.5km of new hedgerow planting will be carried out along selected boundaries of fields within the Proposed Wind Farm site and along any new or realigned access tracks. The replanting areas are presented in the Biodiversity Management and Enhancement Plan (BMEP, Appendix 6-4). This will result in a net gain in this habitat within the Site.		
MM65	Potential Effects on Eroding upland rivers (and associated aquatic Fauna (including Freshwater Pearl Mussel)	<i>Chapter 6: 'Biodiversity' Appendix 6-4 Appendix 6-6</i>	➤ A Freshwater Pearl Mussel Management Plan has been designed specifically for the Proposed Project in order to mitigate the potential impacts specific to freshwater pearl mussel, as outlined in Atkinson et al. (2024). This Plan is included as Appendix 6-6 to this EIAR. Measures are included to prevent impacts at every stage of construction and it also outlines the required ECoW supervision and surface water monitoring protocol. A Biodiversity Management and Enhancement Plan (BMEP) has been prepared with proposed measures including riparian woodland planting, hedgerow planting along watercourses within the Site and livestock-proof fencing along watercourses, to reduce existing pressures on freshwater pearl mussel populations such as nutrient input and sedimentation through poaching. Details of the proposed measures are provided in the BMEP in Appendix 6-4.		
MM66	Potential Effects on Badger	<i>Appendix 6-4:</i>	Mitigation by design was applied to avoid impacts on the recorded badger sett, by relocating the Proposed Turbine T6 and associated infrastructure, and maintaining a 100m buffer to the recorded sett. All works will be carried out in accordance with TII (2005) <i>Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes</i> . Any requirement for piling within 150m of the sett will be restricted to outside of the badger breeding season, as specified in the aforementioned document.		

			A pre-construction badger survey will be carried out to identify the presence of any setts that may have been established in the intervening period, no more than 10 months in advance of construction. If a newly established sett is found within 50m of the Proposed Project footprint, further monitoring and mitigation in line with TII (2005), and in consultation with the NPWS where deemed necessary, will be prescribed as appropriate.		
MM67	Potential Effects on Otter	Chapter 6: 'Biodiversity' Appendix 6-4:	Habitat Loss/Fragmentation, Disturbance, Mortality Although significant impacts are not anticipated, precautionary mitigations are prescribed below: ➤ A pre-commencement survey for otter will be undertaken within 150m upstream and downstream of the proposed new watercourse crossings and crossing upgrades that are required within the Site in advance of commencement of works. ➤ If a holt is found within 150m of construction areas, the works will be undertaken in line with TII (2006)⁷ and if a potential for disturbance is identified, these works will not be undertaken until a derogation licence is obtained. The requirement for a pre-construction survey does not represent a lacuna in the survey assessment but is fully in line with industry best practice. The function of the survey will be to assess any changes in baseline conditions since the time of undertaking the baseline surveys. Habitat Degradation (impacts on water quality) Detailed mitigation measures in relation to the protection of surface water during construction is detailed in Chapter 9 of this EIAR.		

⁷ TII (2006). Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes. Dublin: National Roads Authority.

MM68	Potential Effects on Red squirrel/Pine marten	<i>ELAR Chapter 6</i> <i>Appendix 6-4:</i>	Habitat Loss/Fragmentation No specific mitigation is required for habitat loss. However, as part of the biodiversity enhancement for the Site and as outlined in the BMEP (Appendix 6-4), 2 no. pine marten nest boxes and 2 no. red squirrel nest boxes will be installed within the Site. Indicative locations for installation of the boxes are shown in the BMEP. These have been chosen to suitable habitat for these species within the Site. Disturbance/Mortality A pre-construction survey for pine marten/red squirrel will be carried out to identify the presence of any potential new breeding sites. These surveys will focus on areas of conifer plantation to be felled and all suitable habitat within 50m of the felling footprint. Any potential breeding sites should be monitored to ascertain if they are active breeding sites. Surveys will be undertaken in line with Nature Scot⁸ and TII⁹ guidelines. Should active dreys/dens be identified within the blocks to be felled, the following mitigations and best practice procedures will be followed to ensure that no breeding site for either red squirrel or pine marten are impacted: ➤ Felling works to be undertaken in October-January inclusive if an active drey or den is found, this will avoid the main breeding season (February-September) when vulnerable young are most likely to be found within breeding sites for both species. ➤ Any breeding sites identified within the 50m buffer that wouldn't be directly affected by felling works but disturbance related impacts will be clearly marked out with an exclusion zone, and works/access through these areas avoided as much as possible. ➤ Plant machinery will be turned off when not in use.		
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⁸ <https://www.nature.scot/sites/default/files/2018-09/Species%20Planning%20Advice%20-%20red%20squirrel.pdf>

⁹ TII guidance (TII, 2009, *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*. Dublin: National Roads Authority).

MM69	Potential Effects on Common Lizard	<i>ELAR Chapter 6</i>	Disturbance/Mortality Common lizard when in brumation are in a state of sluggishness, inactivity, or torpor which would make them extremely vulnerable to works being undertaken in the winter months when they cannot quickly move out of harm's way. As such, works to remove stone walls should be undertaken March to September inclusive to avoid any potential impacts to lizard using stone walls as a winter hibernacula. Where removal of the stone walls is required within the core winter period (October – February) these will be taken down by hand under supervision of an ecologist so that any lizards (if found) can be moved to an alternative (preidentified) safe location.		
MM70	Potential Effects on Bats	<i>ELAR Chapter 6</i> <i>Appendix 6-4:</i> <i>Appendix 6-2:</i>	Loss or Damage to Commuting and Foraging Habitat To offset this loss of linear features, approximately 5.5km of hedgerow and 3.6 ha of native woodland creation is proposed within the Site. This will result in a net gain of linear edge habitat within the Site. Planting will incorporate native species appropriate to the local area and will aim to strengthen existing habitat connectivity and ecological function. Full details of this enhancement planting are provided in the Biodiversity Management and Enhancement Plan (BMEP) (Appendix 6-4). Displacement of Individuals or Populations The following construction best practice will be employed to minimise general noise and disturbance potential: During the construction phase, plant machinery will be turned off when not in use and all plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (S.I. No. 632 of 2001).		

			Where construction phase lighting is required, a site-specific lighting strategy in line with Section 6.1.2 of Appendix 6-2 will be implemented in accordance with current best-practice guidance to minimise light spill, maintain dark corridors and avoid illumination of retained linear features, sensitive habitats and known roost locations.		
ElAR Chapter 7: 'Ornithology'					
Pre-Commencement Phase					
MM74	Pre-commencement Surveys	Chapter 7:	A pre-construction bird survey at the Proposed Wind Farm site will be organised to ensure that any sensitive roost or nest sites in the works area are identified and disturbance to these are avoided. Further details are provided in Appendix 7-7: Bird Monitoring and Mitigation Programme of Chapter 7: 'Ornithology'.		
Construction Phase					

MM75	Disturbance to Birds	<i>Chapter 7:</i> <i>Appendix 4-3</i> <i>Appendix 7-7:</i>	A CEMP has been prepared and will be in place prior to the start of the construction phase. Measures specific to birds are detailed below: ➤ Works will commence outside the bird nesting season (1st of March to 31st of August inclusive). ➤ The removal of woody vegetation will be undertaken in full compliance with Section 40 of the Wildlife Act 1976 – 2022. Where sections of woody vegetation are removed for the purposes of the junction and road upgrades, these will be replaced with suitable hedge/tree species which are common in the local context. ➤ Noise limits, noise control measures, hours of operation (i.e. dusk and dawn is high faunal activity time) and selection of plant items will be considered in relation to disturbance of birds. All plant and equipment for use will comply with the European Communities (Noise Emission By Equipment For Use Outdoors) Regulations, 2001, as amended (SI 632/2001). Plant machinery will also be turned off when not in use. ➤ Silt fences will be installed as an additional water protection measure around existing waterbodies. ➤ If winter roosting or breeding activity of birds of high conservation concern is identified, no works shall be undertaken within a species-specific disturbance buffer of the roost/nest, 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.		
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EIAR Chapter 8: 'Land, Soils & Geology'

Construction Phase

MM78	Land Take	Chapter 8:	The Proposed Project has been designed to minimise permanent land-take by optimising the location of turbines and associated infrastructure and, where practicable, utilising existing forestry tracks and disturbed areas. The Proposed 110kV Underground Cabling Route will be installed predominantly within the existing public road corridor, thereby reducing the requirement for permanent occupation of previously undeveloped land. The construction sequence described in Chapter 4: <i>'Description of the Proposed Project'</i>, Section 4.7.2 also includes the reinstatement of temporary working areas following completion of the works.		
MM79	Subsoil and Bedrock Excavation	Chapter 8:	The following mitigation measures will be implemented during construction: ➤ Existing forestry roads and access tracks will be upgraded and used where practicable to minimise the extent of new excavation works. ➤ Excavation will be limited to the minimum extent necessary for the construction of the Proposed Project. ➤ Stripped topsoil and subsoil will be stored separately, where appropriate, and reused during reinstatement and landscaping works. ➤ Suitable bedrock extracted from the proposed borrow pits and other infrastructure locations will be processed and reused as construction aggregate within the Proposed Project. ➤ Excavated spoil will be managed in accordance with the site spoil management plan as discussed in MM31 above, including the reinstatement of borrow pit voids, temporary stockpiling where required, and the reuse of suitable material for landscaping and linear berm construction. ➤ Temporary stockpiles will be located, managed and stabilised to minimise erosion and localised instability. ➤ Drainage and sediment-control measures described in Chapter 9, Surface Water Management Plan (SWMP) and the CEMP will be implemented to manage runoff from excavation areas and temporary stockpiles.		

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MM80	Accidental Spills, Leaks or Other Releases	Chapter 8:	The following measures will be implemented during the construction. Hydrocarbons and Chemicals: > The highest standards of site management will be maintained, with the utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the Site and surrounding environment during construction; > An Emergency Response Plan for accidental spillages will be implemented as part of the CEMP. All construction staff will be familiar with the emergency procedures and the use of the relevant equipment; > The ECoW will oversee the pollution prevention measures agreed for the Site to ensure that they are operating safely and effectively, as well as having responsibility for the implementation of Emergency Procedures for spill control measures; > Where possible, refuelling will occur at an off-site controlled fuelling station; > On-site refuelling will be undertaken using a fuel truck, with spill kits readily available for accidental leakages or spillages; > Refuelling will be undertaken by designated, suitably trained personnel only; > Refuelling of construction machinery will take place using drip trays at all times; > All plant and machinery will be serviced before being mobilised on-site and will be regularly inspected and maintained to minimise the risk of leaks and spillages; > Maintenance of construction vehicles or plant will, where practicable, be undertaken off-site; > Spill response kits will be available at all active work areas, refuelling locations, and construction compounds, and personnel will be trained in their use; > Fuels stored on-site will be minimised. Storage areas, where required, will be bunded appropriately for 110% of the fuel storage volume for the time period of construction and fitted with a storm drainage system and an appropriate oil interceptor; and, > All waste tar material arising from the excavation of the 110kV underground cabling trench and resurfacing of roads associated with the Proposed Project will be removed off-site and taken to a licenced waste facility.		

			Cement-based Products: ➤ No batching of wet-cement products will occur on-site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place; ➤ Concrete batching, washdown and washout activities will take place off-site. Concrete works will be managed to prevent accidental releases to soils or surface waters. ➤ Where possible, pre-cast elements for culvert and watercourse crossings will be used; ➤ No washing out of any plant used in concrete transport or concreting operations will be allowed on-site; ➤ Where concrete is delivered on-site, only the chute need be cleaned, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water is to be directed to lined, cement washout ponds before being removed off-site by an appropriately authorised waste collector for disposal at an authorised waste facility. The washout ponds will be covered when not in use to prevent rainwater collecting; ➤ Weather forecasting will be used to assist in planning large concrete pours, and large pours will be avoided where prolonged periods of heavy rain are forecast; ➤ Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event; and, ➤ At proposed turbine foundations, sand blinding, DPM, and lean-mix blinding are used to vertically contain the concrete. While the concrete is contained laterally by temporary/permanent shuttering. The concrete cures within 72 hrs. Emergency Response Plan Wastewater Management: ➤ During the construction phase, a self-contained port-a-loo with an integrated waste holding tank will be used at each of the site construction compounds maintained by the providing contractor, and removed off-site on completion of the construction works;		
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			- Water supply for the on-site office and other sanitation will be brought on-site and removed off-site after use to be discharged at a suitable off-site treatment location; and, - No water will be sourced on-site, nor wastewater discharged on-site. - An Emergency Response Plan for the construction phase to deal with accidental spillages will be included in the CEMP (Appendix 4-3). During the construction phase, a self-contained port-a-loo with an integrated waste holding tank will be used at each of the site construction compounds maintained by the providing contractor, and removed off-site on completion of the construction works; - Water supply for the on-site office and other sanitation will be brought on-site and removed off-site after use to be discharged at a suitable off-site treatment location; and, - No water will be sourced on-site, nor wastewater discharged on-site.		
ELAR Chapter 9: 'Hydrology and Hydrogeology'					
Pre-construction & Construction Phases					
MM83	Felling	<i>Chapter 9:</i> <i>Appendix 4-3</i>	Best practice methods will be incorporated, in accordance with: - DAFM (2019): Standards for Felling and Reforestation. - Coillte (2009): Forest Operations and Water Protection Guidelines. - Coillte (2009): Methodology for Clear Felling Harvesting Operations; Forest Service (Draft). - Forest Service of the Department of Agriculture, Food & the Marine (2008): 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. During the Proposed Project construction phase a self-imposed buffer zone of minimum 50 metres will be maintained for natural watercourses where possible. It is proposed that		

			2.97ha of forestry will be felled within 50m of natural watercourses within the Proposed Wind Farm site. Mitigation measures will be implemented wherever clear-felling is planned. The objective will be to mitigate the risk of mobilising suspended solids and nutrients into drains and surface water courses, as follows in the design stage: ➤ Small felling areas (<25ha), sequencing of felling to avoid intense felling in one subcatchment. ➤ Limiting felling areas and sequencing the felling to avoid intense felling (>25ha) in one subcatchment. ➤ Machine combinations (i.e. handheld or mechanical) will be chosen which are most suitable for ground conditions and which will minimise soils disturbance. ➤ Sediment/Silt traps will be strategically placed downslope within plantation drains near watercourses before ground preparation. The purpose is to slow water flow, increase residence time, and allow settling of silt. No direct discharge of such drains to water courses will occur. ➤ Crossing of watercourses away from bridges and culverts will not be permitted. Checking and maintenance of roads and culverts will be on-going throughout felling activity. No tracking of vehicles through watercourses will occur. Existing interceptor drains will also not be disturbed. ➤ Clay, soil and silts will be removed from roads during wet periods and dust will be suppressed during dry spells. ➤ Main drains that accommodate the discharge from existing forestry drains will include rock armour, as required, where there are steep gradients. ➤ On steep slopes and where felling inside the 50-metre buffer is required, it will be necessary to install double or triple sediment traps. All drainage channels will taper out before entering the buffer zone. This ensures that discharged water fans out over the buffer zone before entering the aquatic zone, with sediment filtered out by ground vegetation within the zone. ➤ Drains and silt traps will be maintained throughout all felling works, ensuring that they are clear of sediment build-up and are not severely eroded. Machine access will be		
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			maintained to enable the accumulated sediment to be excavated. Sediment will be carefully disposed of in the spoil management areas and/or borrow pits. ➤ Correct drain alignment, spacing and depth will ensure that erosion and sediment build-up are minimized and controlled. ➤ Branches, logs or debris will not be allowed to build up in aquatic zones. All such material will be removed when harvesting operations have been completed, but care will be taken to avoid removing natural debris deflectors. ➤ Extraction tracks near drains need to be broken up and diversion channels created to ensure that water in the tracks spreads out over the adjoining ground. Culverts on drains exiting the Site will be unblocked. ➤ Brash mats will be used to support vehicles on soft ground, reducing soil erosion and avoiding the formation of rutted areas. Brash mat renewal will take place when they become heavily used and worn. Provision will be made for brash mats along all off-road routes, to protect the soil from compaction and rutting. Where there is risk of severe erosion, extraction will be suspended during periods of high rainfall. ➤ Timber will be stacked in dry areas and outside the hydrological buffer zones. ➤ Works will not be conducted during significant rainfall events (see MM84) in order to minimise entrainment of exposed sediment in surface water run-off. ➤ Branches, logs or debris will not be allowed to build up in aquatic zones. All such material will be removed when tree-felling operations have been completed. ➤ Refuelling or maintenance of machinery will not occur within 50m of a watercourse. Mobile bowser, drip kits, qualified personnel will be used where refuelling is required. ➤ A permit to refuel system will be adopted. The following items will be conducted in relation to drain inspection and maintenance during pre-felling inspections and after: ➤ Communication with tree felling operatives in advance to determine whether any areas have been reported where there is unusual water logging or bogging of machines (i.e., hot spot areas). ➤ Inspections of plant and machinery will be conducted prior to any works to assure all are in good condition.		
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			➤ Inspection of drainage ditches and outfalls. During pre-felling inspections, the main drainage ditches will be identified. The pre-felling inspection will be conducted during rainfall events. ➤ Following tree felling, all main drains will be inspected to ensure that they are functioning. ➤ All accumulated silt will be removed from drains and culverts, and silt traps, and this removed material will be deposited away from watercourses to ensure that it will not be carried back into the trap or stream during subsequent rainfall.		
MM84	Earthworks	<i>Chapter 9:</i> <i>Appendix 4-3</i>	There will be no stockpiling of excavated material within 50 m of any natural water courses or within 10 m of any drainage features on the Site. Due to the overland flow observed in the fields around T12 and the proximity of the area to the River Licky, there will be no local stockpiling of material around T12 as illustrated in Figure 9-22 of Chapter 9 of the EIAR. Earthworks will not be conducted during significant storm events. The works programme for the entire construction stage of the Proposed Project will take account of weather forecasts, notably predicted rainfall. Large excavations and movements of soil/subsoil or vegetation stripping will be scaled back or suspended if heavy rain is forecast. Threshold rainfall values will serve to guide decisions to suspend works, visually and/or judged from weather forecasting, by either of the following: ➤ High-intensity rainfall events, >10 mm/hr. ➤ Heavy frontal rainfall lasting most of the day, >25 mm in a 24-hour period. ➤ More than half the monthly average rainfall over 7 days. The ECoW is responsible for the checking and communication of weather forecasts as outlined in the CEMP. Prior to suspending works for climatic reasons, the following control measures will be completed: ➤ Open excavations will be secured. ➤ Temporary or emergency drainage will be provided to prevent back-up of surface runoff in work areas.		

			➤ Working for up to 12 hours after heavy rainfall events will be avoided to ensure drainage systems are not overloaded. Decisions are subject to visual inspection and judgement by ECoW. The intent and objective is to control erosion, avoid collapses of embankments, and limit the mobilisation and transport of sediments. Key mitigation by design measures that will be implemented comprise source controls, in-line controls and treatment systems, as follows: ➤ Source control measures cover working areas, staging areas and stockpiles. Methods that will be employed are diversion drains, flume pipes, sandbags, oyster bags filled with gravel, and filter fabrics. Flexibility to adapt methods will be required based on location-specific conditions, as judged by supervising engineers or the ECoW from visual inspection. ➤ In-Line controls involve settling of suspended sediments and particulate organic matter with the use of silt fences, sand or oyster bags, weirs, baffles, and check dams. Flow limiters and sump pumping systems may be employed where needs arise in order to maintain the hydraulic functioning of the existing drain system. ➤ Treatment systems involve sediment traps and temporary sumps/attenuation ponds. ➤ Treatment systems involve sediment traps and temporary sumps/attenuation ponds. ➤ If discharge water fails to be of a high quality during regular inspection, then a filtration treatment system will be used to filter discharge water before release to water courses. This applies for the entire construction phase. Particular care will be taken during any such application near receptor water bodies as certain chemical used for flocculation can affect the pH of watercourses. Manufacturers will be consulted prior to the potential use of filtration treatment systems, to ensure the application will not have negative effects on receptor water quality. ➤ For discharges near water courses, within the 50 m buffer, double silt fences will be employed. These will be inspected, maintained, and remain in place throughout the entire construction phase. ➤ Silt bags will be used where small to medium volumes of water need to be pumped from excavations. As water is pumped through the bag, the majority of the sediment is retained by the geotextile fabric allowing filtered water to pass through. Silt bags will be used with natural vegetation filters or sedimats.		
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			➤ Sediment entrapment mats, consisting of coir or jute matting, will be placed at the silt bag location to provide further treatment of the outfall from the silt bag. Sedimats will be secured to the ground surface using stakes/pegs. Sedimats will extend the full width of the outfall to ensure all water passes through this additional treatment measure. Level spreaders will be designed for each outfall. Stockpiles will be progressively covered or sealed with the excavator bucket during stockpiling, and covers will be secured once a stockpile has reached capacity. It is proposed that excavated spoil will be used for landscaping where required. The excess material will be used for backfilling the borrow pits and roadside linear berms within the Site. Excavated 'clay pan' material will only be used for the backfilling of borrow pits. Construction works will be sequenced to ensure borrow pit(s) will be available for backfilling before 'clay pan' material is excavated. ➤		
MM85	Watercourse crossings	<i>Chapter 9:</i> <i>Appendix 4-3:</i>	Direct in-stream works will not be required. All works will be conducted in accordance with the CEMP which incorporates the best practice IFI "Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters" (IFI, 2016). Related activity incorporates many of the same measures that are presented in MM84 above. Additionally, the following measures will be implemented: ➤ All new stream crossings within the Proposed Wind Farm site will be bottomless-box culverts or clear-span crossings. Existing banks will remain undisturbed. Abutments will be constructed from precast units combined with in-situ foundations. ➤ All guidance / mitigation measures required by the OPW and/or the Inland Fisheries Ireland (IFI) is incorporated into the design of the proposed crossings; ➤ Plant and equipment will not be permitted to track across the watercourse; ➤ Once the foundations have been completed at both sides of the watercourse, the pre-cast concrete box culvert will be installed using a crane and there will be no contact with the watercourse; ➤ Where a box culvert is installed in sections, the joint will be sealed to prevent granular material entering the watercourse;		

			➤ During near-stream construction works, double-row silt fences will be emplaced immediately downgradient of work areas for the duration of activity. ➤ In accordance with IFI (2016), any near-stream works will be undertaken from July to September inclusive, i.e., the relatively drier summer period. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses. Any deviation that may be temporarily necessary will be done in discussion with the IFI. ➤ All new river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent (Arterial Drainage Act, 1945). Underground cabling routes within the Site (e.g., from turbines) will follow new or existing access roads, and cables will pass within the structure of the road and associated culverts, with no interaction with the watercourse.		
MM86	Cable works installation	Chapter 9:	Cable trenches will be constructed in short, controlled sections, minimising the amount of ground disturbed at any one time. This minimises the potential for drainage runoff and silt or suspended solids to enter water courses. Each short section of trench is excavated, ducting installed and bedded, and backfilled with the appropriate materials, before work on the next section commences. In-stream works will be avoided in all cases. Detailed method statements will be prepared and implemented by contractors, which will incorporate measures to protect watercourses from potential discharges of sediment, drilling fluids, fuel spills. ➤ Excavated material is stored on the up-gradient side of the trench and is temporarily sealed/smoothed over, using the back of the excavator. ➤ Material stockpiles should be stored at least 50m back from drains and watercourses on level ground with a silt fence inserted at the base to prevent runoff. ➤ Silt fences will be installed temporarily downgradient of the cable trench works area. ➤ Excess subsoil is removed from the cable trench works area immediately upon excavation, and in the case of the Proposed Project, will be transported to one of the void borrow pits or used for landscaping and reinstatement elsewhere on-site or a nearby, licenced waste facility.		

			➤ 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. ➤ Ground water and surface water accumulating in the base of trenches will not be pumped directly to roadside drains or watercourses unless it is clean and free from solids.		
MM87	Dewatering and pumping from open excavations	Chapter 9:	Pumping of water from excavations will be necessary, so localised and temporary groundwater lowering cannot be avoided if or where it is implemented. Quantities will be small given the generally low-permeability characteristics of both the till and the bedrock groundwater flow system. Additionally, excavations will remain relatively shallow and most turbine bases and proposed borrow pits are located in elevated areas near hilltops. Pumping and water management is a matter of routine for contractors familiar with this type of development and activity. No direct discharges to streams will be permitted, and this will be enforced by the ECoW. All pumped water must be led and pass through a suitably sized stilling pond prior to diffuse discharge to ground or a drain away from the excavation location. The water to be pumped, which contains suspended solids, will be collected in sumps, pumped out, and led to associated settling ponds which will be established in the first stage of construction. The purpose is to facilitate the settling out of fine sediments prior to subsequent discharge. The water will be pumped and discharged periodically, on as-needed basis. It is not a continuous process, and quantities pumped will vary from location to location, and seasons. Best practice methods will be applied to prevent accidental pollution of the water in open excavations, as described in MM84.		
MM88	Accidental spills, leaks or other releases	Chapter 9: Appendix 4-3: Appendix 4-4:	The prevention of, and responses to, accidental spills and leaks of fuel and other chemicals are covered by the CEMP and SWMP. The following mitigation measures will be implemented.		

			➤ An Emergency Response Plan for accidental spillages will be implemented as part of the CEMP. All construction staff will be familiar with the emergency procedures and the use of the relevant equipment; ➤ Emergency Response PlanThe ECoW will oversee the pollution prevention measures agreed for the Site to ensure that they are operating safely and effectively as well as having responsibility for the implementation of Emergency Procedures for spill control measures. ➤ Where possible, refuelling will occur at an off-site controlled fuelling station. ➤ On-site refuelling will be undertaken using an offsite fuel truck, with spill kits readily available for accidental leakages or spillages; ➤ Refuelling will be undertaken by designated, suitably trained personnel only; ➤ Refuelling of construction machinery will take place using drip trays at all times; ➤ All plant and machinery will be serviced before being mobilised on-site and will be regularly inspected and maintained to minimise the risk of leaks and spillages; ➤ Maintenance of construction vehicles or plant will, where practicable, be undertaken off-site; ➤ Spill response kits will be available at all active work areas, refuelling locations, concrete works and construction compounds, and personnel will be trained in their use; ➤ Fuels stored on-site will be minimised. Storage areas, where required, will be bunded appropriately for 110% of the fuel storage volume for the time period of construction and fitted with a storm drainage system and an appropriate oil interceptor; ➤ All waste tar material arising from the excavation of the 110kV underground cabling trench and resurfacing of roads will be removed off-site and taken to a licenced waste facility; ➤ An Emergency Response Plan for the construction phase to deal with accidental spillages will be contained within the Construction Environmental Management Plan. ➤ Hydrocarbon interceptors will be installed at the substations and construction compounds.		
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MM89	Release of cement-based products	Chapter 9:	➤ No batching of wet-cement products will occur on-site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place; ➤ Where possible, pre-cast elements for culvert and watercourse crossings will be used; ➤ No washing out of any plant used in concrete transport or concreting operations will be allowed on-site; ➤ Where concrete is delivered on-site, only the chute need be cleaned, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water is to be directed to lined, cement washout ponds before being removed from the Site and discharged at a suitable licensed facility; ➤ The washout ponds will be covered when not in use to prevent rainwater collecting. ➤ Weather forecasting will be used to assist in planning large concrete pours, and large pours will be avoided where prolonged periods of heavy rain are forecast.; and, ➤ Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event; and ➤ At proposed turbine foundations, sand blinding, DPM, and lean-mix blinding are used to vertically contain the concrete. While the concrete is contained laterally by temporary/permanent shuttering. The concrete cures within 72hrs. Risks of pollution will be further reduced as follows: ➤ Concrete will not be transported around on-site in open trailers or dumpers to avoid spillage while in transport. ➤ Arrangements for concrete deliveries on-site will be discussed with suppliers before work starts, routes will be confirmed, and on-site washouts will be prohibited, and emergency procedures will be discussed. ➤ Clearly visible signage will be placed in prominent locations close to concrete pour areas specifically stating washout of concrete lorries is not permitted on-site. ➤ Excavations will be sufficiently dewatered before concreting begins, and dewatering will continue while concrete sets.		
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			➤ Covers will be used on freshly placed concrete to avoid the surface washing away in heavy rain. ➤ Any potential, small surplus of concrete will be disposed of after completion of a pour in suitable locations away from any watercourse or sensitive habitats.		
MM90	Piling Works	<i>Chapter 9:</i>	Proposed mitigation measures relative to piling works will comprise: ➤ Strict QA/QC procedures for piling works will be followed; ➤ Piles will be kept vertical during piling works; ➤ Good workmanship will be employed during all piling works; and, ➤ Where required use bentonite seal to prevent upward/downward movement of surface water/groundwater.		
MM91	Wastewater management	<i>Appendix 4-3:</i> <i>Chapter 9:</i>	➤ During the construction phase, a self-contained port-a-loo with an integrated waste holding tank will be used at each of the proposed construction compounds (and along the Proposed 110kV Underground Cabling Route as required), maintained by the providing contractor, and removed off-site on completion of the construction works; ➤ No water or wastewater will be sourced on the Site, nor discharged to the Site.		
EIAR Chapter 10: 'Air Quality'					
Construction Phase					
MM95	Exhaust Emissions (Construction of Proposed Project Infrastructure, Transport to and from the Site)	<i>Chapter 10:</i>	➤ 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 will produce and follow a site inspection and machinery checklist which will be followed and updated as 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 of excavated material will be minimised by coordinating excavation, placement of material in borrow pits. ➤ The expected waste volumes generated onsite will not 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. ➤ Aggregate materials for the construction of the Proposed Project will be mainly sourced from the on-site borrow pits and other infrastructure excavations, with only small amounts suitable material being sourced from local quarries.		
MM96	Dust Emissions (Construction of Proposed Project Infrastructure)	<i>Chapter 10:</i> <i>Appendix 4-3:</i>	➤ Groundworks (i.e. works with potential to create dust) associated with the Proposed Project will be fully supervised by an ECoW. ➤ The ECoW will have power to halt construction works if required. ➤ 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 by the ECoW 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 of excavated material will be minimised by coordinating excavation, placement of material in borrow pits ➤ 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 proposed new entrance will be checked weekly for damage/potholes and repaired as necessary. ➤ If necessary, excavated material will be dampened prior to transport to the borrow pits. ➤ Waste material will be transferred to a licensed/permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF facility will be local to the Proposed Project to reduce the amount of emissions associated with vehicle movement. ➤ Inspection of stockpiles, reinstated borrow pits, and landscaping areas will be made by the ECoW through regular monitoring of the works.		
MM97	Dust Emissions (Transport to and From the Site)	<i>Chapter 10:</i> <i>Appendix 4-3:</i>	➤ 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 by the ECoW to avoid, insofar as reasonably possible, increased runoff. ➤ All plant and materials vehicles shall be stored in dedicated areas within the Site. ➤ Turbine components and construction materials will be transported to the Proposed Wind Farm on specified haul routes only, as agreed with the local authority. ➤ Construction materials for the Proposed Project will be sourced locally from the onsite borrow pits. ➤ 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 onsite borrow pit will be covered by tarpaulin where necessary. ➤ Waste material will be transferred to a licensed /permitted 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		

EIAR Chapter 11: 'Climate'					
Construction, Operational & Decommissioning Phases					
MM100	Greenhouse Gas Emissions	<i>Chapter 11:</i>	Mitigation measures applied during construction activities will be similar to those applied during construction where relevant and are outlined in MM95–MM98.		
EIAR Chapter 12: 'Noise & Vibration'					
Construction Phase					
MM101	Construction Phase Noise (General)	<i>Chapter 12:</i>	The following list of measures will be considered, where necessary, to ensure compliance with the relevant construction noise criteria: ➤ Limiting the hours during which site activities likely to create high levels of noise or vibration are permitted; ➤ Establishing channels of communication between the contractor/developer, Local Authority and residents; ➤ Monitoring typical levels of noise and vibration during critical periods and at sensitive locations; ➤ Selection of plant with low inherent potential for generation of noise and/ or vibration where practical; ➤ Placing of noise generating / vibratory plant as far away from sensitive properties as practical within the site constraints, and; ➤ The hours of construction activity will be limited to avoid unsociable hours where possible. 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,		

			turbine component deliveries) it could occasionally be necessary to work out of these hours. Where potential temporary exceedances are predicted at the nearest receivers, the following mitigation measures are proposed to reduce noise impacts during the activities: ➤ Orientating plant to minimise the noise impact on nearby receptors where practicable, ➤ Erection of temporary localised mobile noise screens where practicable around activities, ➤ Phasing of work and reduce percentage on time to lower the noise impact.		
MM102	Construction Phase Noise (Blasting)	Chapter 12:	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. 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. The methods used to minimise impacts will consist of the following: ➤ Restriction of hours within which blasting can be conducted (e.g. 09:00 – 18:00hrs). ➤ 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 for verification of results.		

			Trial blasts in less sensitive areas to assist in blast designs and identify potential zones of influence.		
EIAR Chapter 13: 'Landscape & Visual'					
Construction and Operational Phases					
MM107	Mitigation by Siting	Chapter 13:	The Proposed Wind Farm site was strategically selected as a landscape highly suitable for the wind energy development. Through the iterative project design process, various best practice tools for assessing the landscape and visual impact of a proposed wind farm development were utilised to bring forward the optimum design for the Proposed Wind Farm with respect to landscape and visual factors. These tools include landscape modelling, ZTV mapping and the preparation of photomontage visualisations.		
MM108	Mitigation by Design	Chapter 13:	➤ Minimised Impact on Scenic Route Sensitivities designated in Local Policy: The Proposed Turbines are strategically sited in locations that do not interfere, obstruct or significantly impact any of the scenic long-ranging landscape views from nearby designated scenic routes ➤ Appropriate Siting and Design for Landscape Character Type in the Guidelines (DoEHLG, 2006) and Draft Guidelines (DoHPLG, 2019). The Proposed Turbines are sited on a mix of ridges and hillslopes, arranged in multiple clusters with irregular spacing of turbines and an appropriately staggered, linear layout with a range of turbine heights that follows the highly undulating terrain, and are sufficiently distanced from cumulative developments and enclosed visually by the terrain such that the potential for in-combination visibility with cumulative developments is minimised, thereby aligning with best practice siting and design for wind energy developments in the Transitional Marginal landscape character type. ➤ Strategic Siting of Proposed Turbines on Elevated Ridgelines: In line with best practice siting and design guidance of wind farms in the Guidelines (DoEHLG, 2006) and Draft Guidelines (DoHPLG, 2019), the Proposed Turbines are strategically sited on ridges and peaks within the Transitional Marginal landscape character type to achieve clear		

			visual separation between the moving turbine components and the visual complexity of lower ground. ➤ Mitigation for Proposed 110kV Substation. The Proposed 110kV Substation is strategically sited in a compound at lower elevation relative to the adjacent scenic route and residential receptors and which is set within a block of forestry to reduce to potential for visual effects. ➤ Mitigation for Proposed 220kV Loop-in Substation: The Proposed 220kV Loop-in Substation is located in an agricultural landscape that slopes downwards from the northeast and is naturally bounded by mature trees and hedgerows between fields, an area with very few receptors and thereby minimal potential to give rise to landscape and visual effects, especially when viewed from the northwest. LVIA mitigation includes replanting of hedgerows required to be removed as part of the construction works as well as placement of berms with planting along the northwest perimeter of the proposed compound and bolstering of the existing hedgerow with semi-mature vegetation which will further mature over time, to ensure sufficient screening, proposed as part of the design in conjunction with local community consultation. ➤ Pro-active Biodiversity Enhancement Measures: The Proposed Project includes specific pro-active biodiversity enhancement and management measures and interventions to improve the ecological value of the landscape at the Proposed Wind Farm site, including new hedgerow and native woodland establishment within the Proposed Wind Farm and construction of berms/embankments around the infrastructure to facilitate pollinator habitats which have the dual effect of providing localised visual screening, these measures are detailed in the Biodiversity Management and Enhancement Plan in Appendix 6-4 and effects of the Proposed Project on biodiversity and ecology are assessed in the EIAR Chapter 6: 'Biodiversity.' ➤ Proposed 110kV Underground Cabling Route: The intended connection to the national electricity grid is underground, thereby eliminating potential landscape and visual effects during the operational phase on receptors of the route which includes users of the public roadway.		
MM109	Landscape Effects	Chapter 13:	The following measures should be implemented to mitigate landscape effects during the construction phase of the Proposed Project:		

			➤ In all circumstances, excavation depths and volumes will be minimised, and excavated material will be re-used where possible. ➤ For the Proposed 110kV Underground Cabling Route, where the cable trench is to be located in the road verge, subsoil will be temporary-stored on-site and re-used for re-instatement after cabling works. Should any medium planting be removed, it should be replaced with the same or similar species whenever it is not possible to salvage and reinstate. ➤ Any areas of bare soil remaining after the landscaping phase will be seeded as soon as possible with a grass-seed mix to minimise sediment run-off.		
MM110	Visual Effects	Chapter 13:	➤ General housekeeping measures, necessary for Health & Safety requirements, will ensure that the active construction areas will be kept tidy, mitigating localised visual impacts during the Construction Phase. ➤ The location of construction works primarily within forestry blocks in undulating terrain ensures that most construction works will be screened from view either by forestry, topography, or a combination of both. In the event that forestry is felled prior to construction, visibility will be limited by dense or intermittent roadside screening along most roads within the Proposed Wind Farm site		
EIAR Chapter 14: 'Archaeological, Architectural and Cultural Heritage'					
Pre-Construction, Construction and Operational Phases					
MM111	Sub-surface Archaeological Potential	Chapter 14: Appendix 4-3:	Pre-development testing, under licence from the NMS, will be carried out. Testing will only be undertaken in areas where ground disturbance will take place as part of the Proposed Project. The areas to be tested will be chosen by the appointed archaeologist and the number of test trenches agreed between the archaeologist and the NMS through the licensing system. A report on the testing will be compiled on completion of the work. Should archaeological finds, structures or deposits be uncovered as a result of the testing further mitigation measures such as preservation in situ or preservation by record (excavation) may be required and will be decided in consultation with the NMS. Such		

			mitigation measures will be implemented, where relevant, following consultation with the NMS. The location of any potential Cultural Heritage features therein will be recorded and a photographic record made of same. A report on the results of the walk-over survey will be compiled on completion of same and will include any further required mitigation measures such as buffer zones, etc, deemed necessary.		
EIAR Chapter 15: 'Material Assets'					
Material Assets - Traffic					
Construction Phase					
MM112	Traffic Management Plan	<i>Chapter 15:</i> <i>Appendix 15-3:</i>	A Construction Traffic Management Plan (TMP) will be prepared and implemented for the Proposed Project. The TMP will be finalised by the appointed contractor in consultation with Waterford City and County Council and, where necessary, An Garda Síochána, prior to commencement of construction works. The TMP will identify measures to reduce the number of construction vehicles, as well as measures to mitigate the impact of vehicles. The TMP will identify the programme of works, the agreed routes to Site and details of a Site Liaison Officer who will have responsibilities for managing traffic and transport impacts and effects. The TMP will also identify measures to reduce and manage construction staff travel by private car, particularly single occupancy trips. Measures provided in the TMP could include (but are not limited to); ➤ Details of the construction programme and construction traffic types and volumes per months of the construction programme; ➤ Details of site working hours; ➤ No routine HGV deliveries will be scheduled during weekday network peak periods or local school start and finish periods, unless otherwise agreed in advance with Waterford City and County Council and An Garda Síochána;		

			➤ Approved haul routes would be identified and protocols put in place to ensure that HGVs adhere to these routes; ➤ Details of access arrangements for all deliveries, operatives and visitors to the Site will be specified, including parking arrangements; ➤ Details of logistics infrastructure such as unloading areas, welfare facilities, car parking and storage compounds; ➤ All contractors would be provided with a site induction pack containing information on delivery routes and any restrictions on routes; ➤ All Site visitors will undergo a Site induction covering Health and Safety issues at the Contractor's temporary compound and will be required to wear appropriate Personal Protective Equipment (PPE) while onsite; ➤ All contractors would be required to give details of proposed timing of material deliveries to the Site and would be given a specific area for delivery; ➤ The construction material 'lay down' areas would allow for a staggered delivery schedule throughout the day, avoiding peak and unsociable hours (i.e. before 6am and after 10pm); ➤ Under no circumstances would HGVs be allowed to lay-up on surrounding roads; ➤ Details of the site liaison would be provided to all relevant stakeholders; ➤ Temporary construction site signage would be erected along the identified construction traffic routes in accordance with the 'Traffic Signs Manual, Section 8 – Temporary Traffic Measures and Signs for Road Works' and 'Guidance for the Control and Management of Traffic at Roadworks'; ➤ The TMP will include specific measures for delivery of turbine components via abnormally large vehicles including details of a trial run using vehicles with similar dimensions at dates and times agreed with the relevant authorities; ➤ Abnormal load deliveries will be undertaken outside peak traffic periods and subject to detailed delivery scheduling, escort arrangements and advance stakeholder notification procedures; ➤ Temporary traffic management measures associated with the Proposed Project including the Proposed 110kV Underground Cabling Route works will be agreed with Waterford City and County Council in advance of construction and will maintain access to properties, farms and emergency services insofar as reasonably practicable;		
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			➤ All personnel in the team would be in contact with each other and with Site management, who in turn would have mobile and telephone contact with the subcontractors; ➤ The TMP and the control measures therein would be included within all trade contractor tender enquiries to ensure early understanding and acceptance/compliance with the rules that would be enforced on this project; ➤ Measures to maintain roads in a clean and safe condition such as sheeting of vehicles and wheel washing and/or road cleaning measures as appropriate; and ➤ A pre and post construction inspection of the roads would be carried out and their condition recorded. Timings would be agreed with the relevant authorities. The TMP would ensure that there is signage along the construction routes to make residents aware of the additional HGV traffic and to provide the opportunity to plan ahead. The TMP would ensure that construction HGVs do not travel during peak periods or at the start/end of the school day and that they adhere to a lowered speed limits if applicable. Each of these measures would contribute to minimising the level of effect experienced by local residents and road users.		
Material Assets - Other					
Construction and Operational Phases					
MM114	Telecommunications	Chapter 15:	Prior to the operational phase of the Proposed Wind Farm, a testing exercise will be carried out to determine there are no impacts on any radio links which traverse the Proposed Wind Farm site. It is anticipated that the 2 ESB links with potential to be affected by the Proposed Turbines. Both ESB links are proposed to be relayed via the proposed telecommunications relay mast. A TV reception survey will be undertaken prior to the commencement of construction works on the Proposed Turbines (and subsequently post commissioning of the Proposed Turbines) in order to accurately predict the number of households which will be affected by the operation of the Proposed Turbines. Should any houses require remediation the following measures may be required:		

			➤ Redirect viewers receiving antennas to an alternative Saorview transmission site. ➤ Provide alternative coverage from new/additional Saorview transmission sites. ➤ Provide access to Irish TV services from an alternative non-Saorview source. Alternative sources include: a. Direct to home satellite (e.g. subscription Sky TV, noting that Saorsat – the free to air Irish satellite TV service will cease operation in early 2028) b. TV via broadband		
MM115	Aviation	Chapter 15:	<u>Irish Aviation Authority</u> ➤ Agree an aeronautical obstacle warning light scheme for the wind farm development ➤ Provide as-constructed coordinates in WGS84 format together with ground and blade tip height elevations at each wind turbine location and ➤ Notify the Authority of intention to commence crane operations with at least 30 days prior notification of their erection. <u>Department of Defence</u> All turbines should be illuminated by Type C, Medium intensity, Fixed Red obstacle lighting with a minimum output of 2,000 candela to be visible in all directions of azimuth and to be operational H24/7 days a week. Obstacle lighting should be incandescent or, if LED or other types are used, of a type visible to Night Vision equipment. Obstacle lighting used must emit light at the near InfraRed (IR) range of the electromagnetic spectrum, specifically at or near 850 nanometres (nm) of wavelength. Light intensity to be of similar value to that emitted in the visible spectrum of light.		
MM116	Existing Built Services	Chapter 15:	➤ The existing overhead lines will be de-energised by ESB so work can commence on the construction of the towers. ➤ The suitability of machinery and equipment for use near power lines will be risk assessed.		

			➤ All staff will be trained on the routes and operating voltages of overhead electricity lines running above the Site. All staff will be trained to be aware of the risks associated with overhead lines. All contractors that may visit the sites are made aware of the location of lines before they come on to site. ➤ Barriers will run parallel to the overhead line at a minimum horizontal distance of 6 metres on plan from the nearest overhead line conductor wire. ➤ Prior to the delivery of turbines to the Proposed Wind Farm site, a dry run of the route using vehicles with similar dimensions will occur. ➤ When activities must be carried out beneath overhead lines, e.g. component delivery or grid cable laying, 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 is undertaken prior to any works. Overhead line proximity detection equipment will be fitted to machinery when such works are required. ➤ Information on safe clearances will be provided to all staff and visitors. ➤ Signage indicating locations and health and safety measures regarding overhead lines will be erected in canteens and on site. ➤ All staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021'. This will encompass the use of all necessary Personal Protective Equipment and adherence to the site Health and Safety Plan. ➤ All health and safety measures as detailed in Section 5 of the CEMP and Chapter 5 Population and Human Health will be adhered to during the construction, operation and decommissioning phases. ➤ 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.		
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			➤ The contractor must comply with the standard construction codes of practice in relation to working around electricity, gas, water, sewage and telecommunications networks. ➤ In advance of any construction activity, the contractor will undertake pre-commencement surveys to confirm the presence or otherwise of any services such as water supplies. If found to be present, the relevant service provider will be consulted with in order to determine the requirement for specific excavation or relocation methods and to schedule a suitable time to carry out works. ➤ Whilst the Proposed 110kV Underground Cabling Route is not predicted to interact with Uisce Éireann assets, should it not be possible to be cross and water main by undercrossing or overcrossing, the water supply will be turned off by the utility so work can commence on diverting the service. The section of existing pipe will be removed and will be replaced with a new pipe along the new alignment of the service. The works will be carried out in accordance with the utility standards.		
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8. MONITORING PROPOSALS

All monitoring proposals relating to the pre-commencement, construction and operational phases of the Proposed Project are set out in various sections of the EIAR, NIS and Biodiversity Enhancement Plan prepared as part of the planning application to Waterford City & County Council.

This section of the Construction and Environment Management Plan groups together all of the monitoring proposals presented in the EIAR. The monitoring proposals are presented in the following pages. The monitoring proposals are also outlined within Chapter 18: '*Schedule of Mitigation and Monitoring Measures*'. Decommissioning Phase monitoring measures are not included in the table below, however, can be viewed in Appendix 4-6 (Decommissioning Plan) of this EIAR.

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

Table 8-1 Proposed Monitoring Measures

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
Pre-Construction Phase						
MX01	Clear Span Crossing	<i>Chapter 4: Appendix 4-3:</i>	Confirmatory inspections of the proposed new watercourse crossing locations will be carried out by the Project Civil/Structural Engineer and the Project Hydrologist prior to the construction of the crossing.	As required	As Necessary	Project Civil/ Structural Engineer and the Project Hydrologist
MX02	Tree Felling Drainage	<i>Chapter 4 Appendix 4-4</i>	➤ All roads and culverts will be inspected prior to any machinery being brought on Site to commence the felling operation. No tracking of vehicles through watercourses will occur. Vehicles will only use existing road infrastructure and established watercourse crossings. ➤ Conduct daily and weekly inspections of all water protection measures and visually assess their integrity and effectiveness in accordance with Section 3.4 (Monitoring and Recording) and Appendix 3 (Site Monitoring Form (Visual Inspections)) of the Forestry & Freshwater Pearl Mussel Requirements. ➤ Take representative photographs showing the progress of operation onsite, and the integrity and effectiveness of the water protection measures. ➤ Collect water samples for analysis by a 3rd party accredited laboratory, adhering to the following requirements: ➤ Surface water samples shall be collected upstream and downstream of the keyhole felling at suitable sampling locations.	Daily and Weekly Inspections	As Necessary	Project Civil/ Structural Engineer and the Project Hydrologist

			➤ Sampling shall be taken from the stream / riverbank, with no in-stream access permitted. ➤ The following minimum analytical suite shall be used: pH, EC, TSS, BOD, Total P, Ortho-P, Total N, and Ammonia. ➤ Review of operator's records for plant inspections, evidence of contamination and leaks, and drainage checks made after extreme weather conditions.			
MX03	Pre-Construction Baseline Monitoring	<i>Appendix 4-4:</i>	Water quality field testing and laboratory analysis will be undertaken prior to commencement of felling and construction at the Site. The monitoring programme will be subject to agreement with Waterford City & County Council but will be based on the planning stage programme already outlined in the EIAR and CEMP and presented in this document. 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 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.	As required	As Necessary	ECoW
MX04	Badger	<i>Chapter 6:</i>	Due to time that can elapse between the original surveys, any future planning consent and commencement of construction, a pre-construction badger survey will be carried out to identify the presence of any setts that may have been established in the intervening period, no more than 10 months in advance of construction. If a newly established sett is found within 50m of the			

			Proposed Project footprint, further monitoring and mitigation in line with TII (2005), and in consultation with the NPWS where deemed necessary, will be prescribed as appropriate.			
MX05	Otter	<i>Chapter 6:</i>	A pre-commencement survey for otter will be undertaken within 150m upstream and downstream of the proposed new watercourse crossings and crossing upgrades that are required within the Site in advance of commencement of works. If a holt is found within 150m of construction areas, the works will be undertaken in line with TII (2006)¹⁰ and if a potential for disturbance is identified, these works will not be undertaken until a derogation licence is obtained. The requirement for a pre-construction survey does not represent a lacuna in the survey assessment but is fully in line with industry best practice. The function of the survey will be to assess any changes in baseline conditions since the time of undertaking the baseline surveys.			
MX06	Pine Marten/ Red Squirrel	<i>Chapter 6:</i>	Due to time that can elapse between the original surveys, any future planning consent and commencement of construction, a pre-construction survey for pine marten/red squirrel will be carried out to identify the presence of any potential new breeding sites. These surveys will focus on areas of conifer plantation to be felled and all suitable habitat within 50m of the felling footprint. Any potential breeding sites should be monitored to ascertain if they are active			

¹⁰ TII (2006). *Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes*. Dublin: National Roads Authority.

			breeding sites. Surveys will be undertaken in line with Nature Scot ¹¹ and TII ¹² guidelines.			
MX07	Birds	<i>Chapter 7</i>	Pre-commencement and construction monitoring are proposed to identify sensitive nests or roosts in proximity to the works. It is proposed that major construction works will commence outside the bird nesting season (1st of March to 31st of August inclusive) to avoid the most sensitive time of the year for most bird species with the potential to use the Site and its environs. A pre-commencement survey will be undertaken prior to the initiation of works at the Proposed Wind Farm site. This survey will be conducted a maximum of three weeks before the commencement of works. Following commencement, construction phase surveys will be conducted during works. These surveys will be conducted once per month during the breeding season (April to July) and once at the start of the winter season (October). These surveys will continue to be conducted each season for the duration of the construction period. The aim of the pre-commencement and construction phase surveys is to identify sensitive sites (e.g., nests or roosts) in proximity to works. The surveys 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 and any on-going works will cease within a species-specific buffer of this location			

¹¹ <https://www.nature.scot/sites/default/files/2018-09/Species%20Planning%20Advice%20-%20red%20squirrel.pdf>

¹² TII guidance (TII, 2009, *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*. Dublin: National Roads Authority).

			in line with best practice guidance (e.g., Forestry Commission Scotland, 2006; NatureScot, 2022). No works shall be permitted within the buffer until it can be demonstrated that the roost or nest is no longer occupied. All site staff and subcontractors will be made aware of any restrictions to be imposed by means of a toolbox talk and a map of the 'no-work zone' will be made available to all construction staff. The restricted area will also be marked off to alert all personnel on site to the suspension of works within that area.			
Construction Phase						
MX08	Drainage Monitoring and Maintenance	<i>Appendix 4-4:</i>	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.	Weekly	As Necessary	ECoW
MX09	Daily Visual Inspections	<i>Appendix 4-4:</i>	Daily Visual Inspection locations are shown in Figure 4-1 and will be confirmed by the Project Hydrologist and ECoW, prior to the commencement of the construction phase, and a Daily Visual Check Sheet Template is included in Appendix C of Appendix 4-4. Daily Visual Inspections are subject to change upon commencement of construction activity and works in progress within the catchment areas. The following periodic inspection regime will be implemented:	Daily	As Necessary	ECoW

			➤ 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 the CEMP which will be maintained on-site during the construction phase.			
MX10	Continuous Turbidity Monitoring	Appendix 4-4:	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	Continuous and Daily	Daily	Project Hydrologist

			be supplemented by daily visual monitoring at their locations as outlined in the sections below. The proposed locations for continuous, in-situ monitoring will be confirmed by the Project Hydrologist prior to the commencement of the construction phase.			
MX11	Monthly Laboratory Analysis	<i>Appendix 4-4:</i> <i>Appendix 4-3:</i>	Baseline laboratory analysis of a range of parameters with relevant regulatory limits and EQSs shall 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 shall be undertaken for each primary watercourse along the Proposed Grid Connection and within the Proposed Wind Farm site, and specifically following heavy rainfall events (i.e. weekly, monthly and event based).	Monthly	Monthly	ECoW in consultation with the Project Hydrologist and Site Manager.
MX12	Field Monitoring	<i>Appendix 4-4:</i> <i>Appendix 4-3:</i>	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	Monthly	ECoW and Project Hydrologist

MX13	Construction Phase Drainage Inspections and Maintenance	<i>Appendix 4-4:</i> <i>Appendix 4-3:</i>	The developer will appoint a Project Contractor who will be responsible for the construction of the Proposed Project in accordance with this SWMP which will be updated by the contractor as required during the construction phase of the Proposed Project. 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	Weekly	As Necessary	ECoW, Project Contractor and Project Hydrologist
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			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.			
MX14	Site Inspections and Auditing	<i>Appendix 4-4:</i>	Routine inspections of construction activities will be carried out on a daily and weekly basis by the ECoW and the Site Supervisor/Construction Manager to ensure all controls to prevent environmental impact, relevant to the construction activities taking place at the time, are in place. The Project Hydrologist will also assist in compliance of testing and monitoring as required.	Daily, Weekly, Every six months	Every six months	ECoW, Site Supervisor/Construction Manager, Project Hydrologist
MX15	Sub-surface Archaeology	<i>Chapter 14:</i>	Archaeological monitoring under licence from the NMS of any geotechnical / engineering trial pits or investigations will be carried out by a suitably qualified archaeologist. A report detailing the results of the monitoring will be compiled on completion of the work and submitted to the NMS and Planning Authority/Body. Archaeological monitoring of ground works during the construction stage of the Proposed Project under licence from the NMS will be carried out by a suitably qualified archaeologist. Should archaeological finds, structures or deposits be uncovered as a result of the monitoring further mitigation measures such as preservation in situ or preservation by record (excavation) may be required and will be decided in consultation with the NMS. Such mitigation measures will be implemented where relevant following consultation with the NMS. A report detailing the results of the monitoring and/or any further necessary mitigation as referred to above will be compiled on completion of the work and submitted to the NMS and Planning Authority/Body.	As required	As required	Project Archaeologist

			A walk-over survey of any areas currently forested and where infrastructure is proposed will be carried out post-clear-felling but prior to any other works. The location of any potential Cultural Heritage features therein will be recorded and a photographic record made of same. A report on the results of the walk-over survey will be compiled on completion of same and will include any further required mitigation measures such as buffer zones, etc, deemed necessary.			
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9. PROGRAMME 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 stipulates that in the interest of breeding birds, construction will not commence during the breeding bird season, which runs from 1st March to 31st August. The EIAR stipulates that construction may commence between September and the end of March, so that construction activities are ongoing by the time the next breeding bird season comes around and can continue throughout the next breeding season.

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

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

Table 9-1 Indicative Construction Schedule

		Year 1				Year 2			
ID	Task Name	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	Site Health and Safety								
2	Grid Connection								
3	Site Compounds								
4	Site Roads								
5	Substation and Electrical Works								
6	Turbine Hardstands								
7	Turbine Foundations								
8	Backfilling and Landscaping								
9	Turbine Delivery and Erection								
10	Substation Commissioning								
11	Turbine Commissioning								

10. COMPLIANCE AND REVIEW

10.1 Site Inspections and Environmental Audits

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

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

10.2 Auditing

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

In contrast to monitoring and inspection activities, audits are designed to shed light on the underlying causes of non-compliance, and not merely detect the non-compliance itself. In addition, audits are the main means by which system and performance improvement opportunities may be identified. Environmental audits will be carried out by the 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 CEMP. The findings of each audit will be made available to Waterford City & 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 Project:

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.

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

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

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

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

10.4

Corrective Action Procedure

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

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

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

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

10.5

Construction Phase Review

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