

Environmental Impact Assessment Report

Lemanaghan Wind Farm,
Co. Offaly

Chapter 18 Schedule of Mitigation and
Monitoring Measures



Table of Contents

18.	SCHEDULE OF MITIGATION AND MONITORING MEASURES	18-1
18.1	EIAR Mitigation Measures.....	18-1
18.2	EIAR Monitoring Measures.....	18-92

18.

SCHEDULE OF MITIGATION AND MONITORING MEASURES

All mitigation and monitoring measures relating to the pre-commencement, construction, operational and decommissioning phases of the Proposed Project are set out in the relevant chapters of this EIAR.

All mitigation which will be implemented during the various phases of the Proposed Project are presented in Table 18-1 below. The mitigation measures have been grouped together according to their EIAR Chapter and Proposed Project phase and are presented under the following headings:

- > Pre-Commencement Phase;
- > Construction Phase;
- > Operational Phase; and
- > Decommissioning Phase.

The mitigation proposals in the below format provides an easy-to-audit list that can be reviewed and reported on during each phase of the Proposed Project. The proposals for site inspections and environmental audits are set out in the Construction and Environmental Management Plan (CEMP) which is included as Appendix 4-4 of this EIAR. The tabular format in which the below information is presented can be further expanded upon during each Proposed Project phase to provide a reporting template for site compliance audits.

All monitoring measures which will be implemented during the pre-commencement, construction, operational and decommissioning phases of the Proposed Project are outlined in Table 18-2. All monitoring measures were set out in the relevant chapters of this EIAR. The monitoring proposals are presented in terms of the monitoring requirement, frequency of monitoring and the mechanism for reporting results where applicable. By presenting the monitoring proposals in the below format, it is intended to provide a monitoring schedule that can be reviewed and tracked during all phases of the Proposed Project to ensure that all required monitoring is completed.

It is intended that the CEMP will be updated where required prior to the commencement of construction to include all mitigation and monitoring measures, planning conditions and/or alternative monitoring and mitigation measures should they emerge during the course of the planning process and would be submitted to the Planning Authority for written approval prior to the commencement of development.

18.1

EIAR Mitigation Measures

Table 18-1 Schedule of Mitigation Measures

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
EIAR Chapter 4 – Description of the Proposed Project					
Pre-Construction Phase					
MM1	Environmental Management	EIAR Chapter 4	<p>All proposed construction activities and associated mitigation measures for the site will be provided for in a Construction and Environmental Management Plan (CEMP). A CEMP has been prepared for the Proposed Project and is included in Appendix 4-4 of this EIAR.</p> <p>The CEMP includes details of drainage, peat and spoil management, waste management, and clearly outlines the mitigation measures and monitoring proposals that are required to be adhered to in order to comply with the environmental commitments outlined in the EIAR. In the event that planning permission is granted for the Proposed Project, the CEMP will be updated prior to the commencement of the development, to address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned, and will be submitted to the Planning Authority for approval.</p>		
MM2	Environmental Management	Appendix 4-4	<ul style="list-style-type: none"> › The Project Developer will be required to engage an independently and suitably qualified Environmental Engineer, Environmental Scientist, or equivalent, with experience in wind farm construction to fulfil the role of Environmental Clerk of Works (EnvCoW) to oversee the construction works and audit the implementation of the CEMP. The EnvCoW will report to the Project Developer and Project Contractor but will liaise closely with the Construction Manager in relation to the Project Contractor’s day-to-day implementation of the CEMP on site. › The EnvCoW will be nominated by the Project Developer to oversee the Project Contractor’s effective implementation of the Proposed Project’s environmental 		

			<p>requirements and obligations, as captured in the CEMP. The EnvCoW will be responsible for monitoring the works of the Project Contractor from an environmental perspective on behalf of the Project Developer. For the sake of expediency, the EnvCoW will report their ongoing audit findings, monitoring results and site observations to both the Project Developer and the Proposed Contractor, having been nominated by the developer to fulfil the role.</p> <ul style="list-style-type: none"> › The level, detail and frequency of reporting expected from the EnvCoW for the Construction Manager, Developer’s Project Manager, and any Authorities or other Agencies, will be agreed by all parties prior to commencement of construction, and may be further adjusted as required during the course of the Proposed Project. 		
MM3	Surface Water Quality	Appendix 4-6	<ul style="list-style-type: none"> › Water quality field testing and laboratory analysis will be undertaken prior to commencement of vegetation removal and construction at the site. › Analysis will be for a range of parameters with relevant regulatory limits along with Environmental Quality Standards (EQSs) and sampling will be undertaken at designated locations as outlined in Appendix 4-6. › Baseline sampling will be completed on at least two occasions, and these should ideally coincide with low-flow and high-flow stream conditions. The high-flow sampling event will be undertaken after a period of sustained rainfall, and the low-flow event will be undertaken after a dry spell. 		
MM4	Site Drainage Plan	<p>EIAR Chapter 4</p> <p>Appendix 4-4</p> <p>Appendix 4-5</p> <p>Appendix 4-6</p>	<p>The Project Hydrologist will complete a detailed drainage design and maintenance plan before construction commences and will attend the site to set out and assist with micro-siting of proposed drainage controls as outlined in Section 4.9 in Chapter 4 of the EIAR. The drainage system will be excavated and constructed in conjunction with the road and hard standing construction. There is no direct hydraulic connectivity from proposed construction areas to natural watercourses or drains connecting to downstream watercourses.</p> <p>The key principles of drainage design that will be implemented and adhered to as part of the Proposed Project are as follows:</p> <ul style="list-style-type: none"> › 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; 		

			<ul style="list-style-type: none"> > 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; > Maintain the existing hydrology/hydrogeology of the site; > Re-routing existing local drainage pathways as required; > Daily inspection and recording of surface water management system by on-site EnvCoW and immediate remedial measures to be carried out as required. Works will be temporarily ceased if a retained stormwater/sediment load is identified to have the potential to migrate from the site. <p>Pollution Prevention from Water Discharge will encompass the following:</p> <ul style="list-style-type: none"> > Water containing silt will not be discharged or pumped directly to any natural watercourse. All discharges will be made over open ground or into existing field drains with silt trap at a minimum of 20m from nearest watercourse unless otherwise stated. > No excavated material will be stored within any surface water buffer zone. > Pumped water will be directed into track side ditches and treated in settlement ponds and vegetation swales prior to overland discharge. > Pumping of clean water from excavations and over-pumping in drains/ditches/streams will be completed in a manner that will not cause scour or erosion at the point of release/discharge. This will be done by reducing the flow velocities or by use of suitable splash plates, and/or other similar discharge controls. 		
MM5	Preparative Site Drainage Management	Chapter 4 Appendix 4-4 Appendix 4-6	<ul style="list-style-type: none"> > All materials and equipment necessary to implement the drainage measures detailed above, will be brought onsite in phases as they are required during the construction phase > A sufficient number of straw bales, clean drainage stone, terram, stakes, etc., will be kept on site at all times to implement the drainage design measures as necessary. The drainage measures detailed in the above will be installed prior to, or at the same time as the works they are intended to drain. 		
MM6	Drainage Inspection	Appendix 4-4	<ul style="list-style-type: none"> > Prior to commencement of works in sub-catchments across the site, main drain inspections will be completed to ensure ditches and streams are free from debris and blockages that 		

		Appendix 4-6	may impede drainage. It is proposed to complete these inspections on a catchment-by-catchment basis as the construction works develop across the site, as works in all areas will not commence simultaneously.		
MM7	Watercourse Inspection	EIAR Chapter 4 Appendix 4-4	<ul style="list-style-type: none"> › Confirmatory inspections of the proposed watercourse crossing locations will be carried out by the Project Civil/Structural Engineer and the Project Hydrologist prior to the construction of the crossing. 		
MM8	Drainage Maintenance	Chapter 4 Appendix 4-4 Appendix 4-6	<ul style="list-style-type: none"> › An inspection and maintenance plan for the on-site drainage system will be prepared in advance of commencement of any works. Daily visual inspections of drains and outfalls will also be performed during the construction period to ensure suspended solids are not entering streams and rivers on site, to identify any obstructions to channels and to allow appropriate maintenance of the drainage regime. Should the suspended solids levels measured during construction be higher than the existing levels, the source will be identified, and additional mitigation measures implemented. › Any excess build-up of silt levels at dams, the settlement pond, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed. › For this reason, the drainage measures installed on-site should be inspected at least weekly by the contractor and maintained as required during the construction phase of the Proposed Project to ensure good performance. › During the construction phase, all runoff from works areas (i.e., dirty water) will be attenuated and treated prior to being released within the Proposed Project site. All drainage outfall from the Proposed Project site is routed through existing settlement ponds that remain in situ from the previous site use. 		
MM9	Earthworks	Appendix 4-6	<ul style="list-style-type: none"> › Avoid physical damage (river/stream banks and river/stream beds) to watercourses and associated release of sediment; › Avoid excavations within close proximity to surface watercourses; › Avoid the entry of suspended sediment from earthworks into watercourses; and, 		

			<ul style="list-style-type: none"> › Avoid the entry of suspended sediment from the construction phase drainage system into watercourses, achieved in part by ending drain discharge outside the buffer zone and allowing percolation across the vegetation of the buffer zone. 		
MM11	Vegetation Removal	<p>Chapter 4, 9</p> <p>Appendix 4-4</p> <p>Appendix 4-6</p>	<ul style="list-style-type: none"> › The felling will be completed primarily by hand in order to limit disturbance; › If machinery is required, works will be undertaken using machinery which are most suitable for the ground conditions and which will minimise soil disturbance; › Where possible, trees will be felled away from drains to prevent the unnecessary deposition of peat or brash into the bog drains; › Where machinery is required, brash/bog mats will be used to protect the peat surface and reduce erosion; › Silt fences will be installed downgradient of the works to intercept potentially silt laden runoff; and, › Works will be completed during periods of low rainfall. <p>Before the commencement of any vegetation removal works, an ECoW shall be appointed to oversee the works. The ECoW shall be experienced and competent, and shall have the following functions as proposed in the planning application:</p> <ul style="list-style-type: none"> › Attend the site for the setup period when drainage protection works are being installed and be present on site during all vegetation removal works › Prior to the commencement of works, review and agree the positioning by the Operator of the required Aquatic Buffer Zones (ABZs), silt traps, silt fencing (see below), water crossings and onsite storage facilities for fuel, oil and chemicals (see further below); › Be responsible for preparing and delivering the environmental Toolbox Talk (TBT) to all relevant parties involved in site operations, prior to the commencement of the works. › Conduct daily and weekly inspections of all water protection measures and visually assess their integrity and effectiveness in accordance with the proposals outlined in Section 4.2 of the CEMP (Appendix 4-4); <ul style="list-style-type: none"> ○ 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: 		

			<ul style="list-style-type: none"> ○ Sampling shall be taken from the stream/riverbank, with no in-stream access permitted; ○ The following minimum analytical suite shall be used: potential of Hydrogen (pH), Emulsifiable Concentrate (EC), Total Suspended Solids (TSS), Biochemical Oxygen Demand (BOD), Total Phosphorus (Total P), Orthophosphate (Ortho-P), Total Nitrogen (Total N), and Ammonia; ○ Review of operator’s records for plant inspections, evidence of contamination and leaks, and drainage checks made after extreme weather conditions; ○ Prepare and maintain a contingency plan; ○ Suspend work where potential risk to water from siltation and pollution is identified, or where operational methods and mitigation measures are not specified or agreed; and ○ Prepare and maintain a Water Protection Measure Register. This document is to be updated weekly by the EnvCoW. 		
MM12	Traffic Management	<p>EIAR Chapter 4, 15</p> <p>Appendix 4-4</p> <p>Appendix 15-2</p>	<ul style="list-style-type: none"> ➤ A detailed Traffic Management Plan (TMP), incorporating all the mitigation measures set out within the CEMP along with Chapter 15: Material Assets of the EIAR, will be finalised and detailed provisions in respect of traffic management agreed with the Roads Authority and An Garda Síochána prior to construction works commencing on-site. ➤ Prior to the TMP being finalised, a full dry run of the transport operation along the potential routes will be completed using vehicles with attachments to simulate the dimensions of the wind turbine transportation vehicles. This dry run will inform the TMP for agreement with the relevant Authorities. 		
MM13	Peat and Spoil Management	<p>EIAR Chapter 4, 8</p> <p>Appendix 4-3</p>	<ul style="list-style-type: none"> ➤ An interceptor drain will be installed upslope of the designated peat deposition areas to divert any surface water away from these areas. This will reduce the likelihood of debris run-off. ➤ An interceptor drain shall also be installed upslope of the borrow pit. This drain will divert any surface water away from the borrow pit and hence prevent water from ponding and lodging during construction and when reinstated. ➤ The surface of the placed peat and spoil shall be shaped to allow efficient runoff of surface water from the placed arisings. All the recommendations/best practice guidelines for the 		

		Appendix 4-4 Appendix 4-6	placement of peat and spoil in identified peat deposition areas, the proposed onsite borrow pits and alongside access roads will be confirmed by the Geotechnical Engineer prior to construction.		
MM14	Proposed Internal Cabling Works	EIAR Chapter 4 Appendix 4-4 Appendix 4-6	To efficiently control drainage runoff from cable trench works areas, excavated material is stored on the up-gradient side of the trench and is temporarily sealed/smoothed over, using the back of the excavator bucket. Should any rainfall cause runoff from the excavated material, the material is therefore collected and contained in the downgradient cable trench. Excess subsoil is removed from the cable trench works area immediately upon excavation, and in the case of the Proposed Project, would be transported to one of the on-site borrow pit storage areas or used for landscaping and reinstatements of other areas elsewhere onsite.		
MM15	Waste Management	EIAR Chapter 4 Appendix 4-4	Prior to the commencement of the construction phase, a Construction Waste Manager will be appointed by the Contractor. The Construction Waste Manager will be responsible for the implementation of the objectives of the Resource Waste Management Plan (RWMP), ensuring that all hired waste contractors have the necessary authorisations and that the waste management hierarchy is adhered to. The person nominated must have sufficient authority so that they can ensure everyone working on the development adheres to the management plan.		
Construction Phase					
MM16	Refuelling	EIAR Chapter 4, 8, 9 Appendix 4-4	<ul style="list-style-type: none"> ➤ Minimal refuelling or maintenance of construction vehicles or plant will take place on site. Where possible, off-site refuelling will occur at a controlled fuelling station; ➤ On-site re-fuelling will be undertaken only within designated refuelling areas (located a minimum of 50m from waterbodies) using a double-skinned bowser or a refuelling truck with spill kits kept onboard; ➤ Only designated trained operatives will be authorised to refuel plant on-site; 		

		<p>Appendix 4-5</p> <p>Appendix 4-6</p>	<ul style="list-style-type: none"> › Taps, nozzles or valves associated with refuelling equipment will be fitted with a lock system; › All fuel storage areas will be bunded appropriately for the duration of the construction phase. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. All fuel storage areas will be located a minimum of 50m from any waterbody. Ancillary equipment such as hoses, pipes will be contained within the bunded area; › Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage; › The proposed onsite 220kV substation will be bunded appropriately to the volume of oils likely to be stored and to prevent leakage of any associated chemicals to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor; › The plant used during construction will be regularly inspected for leaks and fitness for purpose; and, › An emergency response plan for the construction phase to deal with accidental spillages is contained within the CEMP (which is contained in Appendix 4-4). 		
MM17	Concrete-Based Products Deliveries and Management	<p>EIAR Chapter 4, 9</p> <p>Appendix 4-4</p>	<ul style="list-style-type: none"> › No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and, where possible, emplacement of pre-cast elements will take place; › Where possible pre-cast elements for culverts and concrete works will be used; › No washing out of any plant used in concrete transport or concreting operations will be allowed on site; › Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water is to be isolated in temporary lined wash-out pits located near proposed site compounds. These temporary lined wash-out pits will be removed from the site at the end of the construction phase; › Will use weather forecasting to plan dry days for pouring concrete; and, › Will ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event. 		

MM18	Concrete Pouring	<p>EIAR Chapter 4, 9</p> <p>Appendix 4-4</p> <p>Appendix 4-5</p> <p>Appendix 4-6</p>	<ul style="list-style-type: none"> ➤ Using weather forecasting to assist in planning large concrete pours and avoiding large pours where prolonged periods of heavy rain is forecast. ➤ Restricting concrete pumps and machine buckets from slewing over watercourses (including drains and ditches) while placing concrete. ➤ Ensuring that excavations are sufficiently dewatered before concreting begins and that dewatering continues while concrete sets. ➤ Ensuring that covers are available, and used, when necessary, for freshly placed concrete to avoid the surface washing away in heavy rain. ➤ The small volume of water that will be generated from washing of the concrete truck's chute will be directed into a temporary, lined, impermeable containment area, or a Siltbuster-type concrete wash unit or equivalent. ➤ Surplus concrete after completion of a pour will be taken off-site and disposed of at an appropriately authorised facility. ➤ Concrete pours will be managed and supervised to ensure there will be no leakage/seepage/discharge of concrete or concrete water during the construction phase. ➤ Concrete wash water, and waste concrete will be managed appropriately on site at a lined concrete wash out pit(s). 		
MM19	Road Cleanliness	<p>EIAR Chapter 4</p> <p>Appendix 4-4</p>	<ul style="list-style-type: none"> ➤ Internal access roads will already be constructed before other road-going trucks begin to make regular or frequent deliveries to the site (e.g., with steel or concrete). The internal access roads will comprise granular fill, and so the public road-going vehicles will not be travelling over soft or muddy ground where they might pick up mud or dirt. ➤ The contractor will be responsible for ensuring that all vehicles egressing the site have used the wheelwash facilities. However, a road sweeper will be made available by the contractor for the cleaning of public roads in the event that they are dirtied by trucks associated with the Proposed Project site. 		
MM20	Watercourse Buffers	<p>EIAR Chapter 4, 9</p>	<ul style="list-style-type: none"> ➤ Buffer zones around the existing natural drainage features have been used to inform the layout of the Proposed Project. 		

		Appendix 4-4			
		Appendix 4-6			
MM21	Water Discharge	<p>EIAR Chapter 4</p> <p>Appendix 4-4</p> <p>Appendix 4-5</p> <p>Appendix 4-6</p>	<ul style="list-style-type: none"> > There will be no direct discharges to any natural watercourses, with all drainage waters being dispersed as overland flows. All discharges from the proposed works areas will be made over vegetation filters at an appropriate distance from natural watercourses .All discharges will be made over open ground or into existing field drains with silt traps at a minimum of 20m from nearest watercourse unless otherwise stated .Dewatering silt bags will also be used where water is pumped temporarily from excavations (e.g., turbine bases). Water will be pumped into the silt bags, and the arising discharge will be filtered through the silt bag fabric and allowed to flow into local collector drains. > No excavated material will be stored within any surface water buffer zone. Pumped water will be directed into track side ditches and treated in settlement ponds and vegetation swales prior to overland discharge. > Pumping of clean water from excavations or over-pumping in drains/ditches/streams will be completed in a manner that will not cause scour or erosion at the point of release/discharge. This will be done by reducing the flow velocities or by use of suitable splash plates, and/or other similar discharge controls. > Collect potentially silt-laden runoff from works areas via downgradient collector drains and manage via series of avoidance, source, in-line treatment and discharge to ground via infiltration drains and infiltration areas. 		
MM22	Wastewater Management	EIAR Chapter 4	<ul style="list-style-type: none"> > During the construction phase, a temporary toilet block unit will be located within the temporary construction compound for use during the construction phase. Elsewhere on site, self-contained port-a-loo with an integrated waste holding tank will be used on site for toilet facilities. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by an appropriately consented waste collector to wastewater treatment plants, and; 		

			<ul style="list-style-type: none"> › The water supply to the site will be from a temporary water storage tank which will be filled using a mobile water tank which will source water locally as required. 		
MM23	Collector Drains	<p>EIAR Chapter 4</p> <p>Appendix 4-4</p>	<ul style="list-style-type: none"> › Collector drains will be installed downgradient of the main works areas to collect surface flow runoff where it might have come into contact with exposed surfaces and collected silt and sediment. Swales will intercept the potentially silt-laden water from the excavations and construction areas of the site and prevent it reaching natural watercourses. › Collector drains will be installed in advance of any main construction works commencing. The material excavated to make the swale will be compacted on the downslope edge of the drain to form a diversion dike. 		
MM24	Interceptor Drains	<p>EIAR Chapter 4, 9</p> <p>Appendix 4-6</p>	<ul style="list-style-type: none"> › Interceptor drains will be installed upgradient of any works areas to collect surface flow runoff and prevent it reaching excavations and construction areas of the site where it might otherwise have come into contact with exposed surfaces and collected silt and sediment. The drains will be used to divert upslope runoff around the works area to a location where it can be redistributed over the ground surface as sheet flow. › Where required, interceptor drains will be installed in advance of any construction works commencing. 		
MM25	Check Dams	<p>EIAR Chapter 4</p> <p>Appendix 4-5</p> <p>Appendix 4-6</p>	<ul style="list-style-type: none"> › The velocity of flow in the interceptor drains will be controlled by check dams, which will be installed at regular intervals along the drains to ensure flow in the channel is non-erosive. On steeper sections where erosion risks are greater, a geotextile membrane will be added to the channel. › Use of existing field drains or track side swales with check dams, and/or filtration check dams will reduce silt in runoff water as required. › Check dams will be inspected and cleaned regularly. Clean stone flow control check dams will be made of locally won / geologically similar well-graded clean stone. Aggregate size for stone check dams to be typically 20- 40mm clean stone. On sloping sections of the access tracks, 40mm check dams to be protected from washing away through the placement of 100m stone on the downhill face of the check dam and by wrapping in geotextile. 		

			<ul style="list-style-type: none"> › Build-up of silt levels at check dams will be removed and disposed of appropriately. Silt levels at check dams will be visually inspected on a daily basis as part of an ongoing drainage maintenance programme during the construction phase. Where check dams become clogged with silt or vegetation, stone check dam to be removed and replaced subsequent to the removal of silt. › Spacing and frequency of check dams / silt traps will be dependent upon longitudinal gradient of swale. › Location of filtration check dams /silt traps to be agreed on site with Project Geotechnical Engineer. Settlement ponds to be constructed in a manner where they may be easily infilled at a later date (post completion of the turbine base and hardstand construction). Only suitable materials excavated from the pond to be used to form part of the embankment around the pond. 		
MM26	Peat Ditch Silt Traps	EIAR Chapter 4 Appendix 4-6	<ul style="list-style-type: none"> › Silt traps will be installed in field drains downstream of drainage outfalls from works areas. › The peat ditch silt traps will be constructed using stacked timber logs, or marine plywood. These can also be covered in geotextile to enhance filtration. 		
MM27	Vegetation Filters	EIAR Chapter 4 Appendix 4-6	<ul style="list-style-type: none"> › All discharges from the proposed works areas will be made over vegetation filters at an appropriate distance from natural watercourses. 		
MM28	Settlement Ponds	EIAR Chapter 4 Appendix 4-6	<ul style="list-style-type: none"> › Settlement ponds will be used to attenuate runoff from main works areas (i.e., from turbine base/hardstand areas, construction compounds, and the substation) of the site during the construction phase. › Settlement ponds will be located towards the end of collector drains, close to where the treated water will be discharged to field drains/main drains. › During the construction phase, a water level indicator such as a staff gauge will be installed in each settlement ponds with marks to identify when sediment is at 10% of the settlement ponds capacity. Sediment will be cleaned out of the still pond if it exceeds 10% of pond 		

			capacity. Settlement ponds will be inspected weekly and following rainfall events. Inlet and outlets will be checked for sediment accumulation and other issues that might interfere with flows.		
MM29	Silt Bags	EIAR Chapter 4 Appendix 4-6	<ul style="list-style-type: none"> ➤ Dewatering silt bags allow the flow of water through them while trapping any silt or sediment suspended in the water. The silt bags provide a passive non-mechanical method of removing any remaining silt contained in the potentially silt-laden water collected from works areas within the site. ➤ Dewatering silt bags can also be used as an additional filtration measure downgradient of settlement ponds, wherever it is deemed appropriate, throughout the site. The water will flow, via a pipe, from the settlement ponds into the silt bag. The silt bag will allow the water to flow through the geotextile fabric and will trap any of the finer silt and sediment remaining in the water after it has gone through the previous drainage measures. The dewatering silt bags will ensure that there will be no loss of peaty silt into any field drain/main drain. 		
MM30	Siltbuster	Chapter 4 Appendix 4-6	<ul style="list-style-type: none"> ➤ A “siltbuster” or similar equivalent piece of equipment may be used to filter any water pumped out of excavation areas, if necessary, prior to its discharge to settlement ponds or swales. ➤ The unit stills the incoming water/solids mix and routes it upwards between a set of inclined plates for separation. Fine particles settle onto the plates and slide down to the base for collection, whilst treated water flows to an outlet weir after passing below a scum board to retain any floating material. The inclined plates dramatically increase the effective settling area of the unit giving it a very small footprint on site and making it highly mobile. 		
MM31	Over-The-Edge (OTE) Drainage	Chapter 4 Appendix 4-6	<ul style="list-style-type: none"> ➤ OTE drainage allows runoff from access tracks to flow into local field drains and be managed via the existing site drainage system. OTE drainage will only occur where topography allows, and it is only proposed in areas of low risk and remote from outfall locations (at least 150m from bog outfall locations). ➤ Silt traps and check dams will be installed in field drains downstream of OTE drainage areas, and these measures will provide attenuation and treatment of any arising dirty water. 		

MM32	Clear Span Watercourse Crossings	<p>EIAR Chapter 4</p> <p>Appendix 4-4</p> <p>Appendix 4-6</p>	<p>It is proposed to construct a clear-span watercourse crossing along the site access roads at 2 no. locations using a clear-span bridge. The locations of these crossings are shown on the site layout drawings included in Appendix 4-1 to Chapter 4 of the EIAR.</p> <p>The standard construction methodology for the installation of a clear-span bridge watercourse crossing is as follows:</p> <ol style="list-style-type: none"> 1. <i>Silt fencing is to be erected at run-off areas adjacent to the works area.</i> 2. <i>Oil booms are to be established both upstream and downstream of the works. Spill kits are required on both banks of the stream and are to include oil-only absorbent booms.</i> 3. <i>Area to be Cable-Avoidance Tool (CAT) scanned for any potential existing services. Any possible services are to be marked and identified.</i> 4. <i>The culvert location will be set out by the Site Engineer.</i> 5. <i>Life Buoys and spill kits will be positioned at prominent locations adjacent the works.</i> 6. <i>Excavation will commence using an excavator, reducing ground levels at the existing crossing to expose the existing pipe. Spoil arising from the works will be sidecast and/or transported to the peat deposition area.</i> 7. <i>Flows will be plugged temporarily to allow installation of clay bunds and removal and replacement of the pipe. Dependent on flows, over-pumping may be necessary for a time to allow temporary bunding of the works area both upstream and downstream and directing of flows towards the pipe.</i> 8. <i>Where over-pumping is necessary, a 4" (0.1m) pump will be utilized using a shallow sump to discharge downstream. The downstream end is to discharge on a plywood sheet or similar placed at an angle on the embankment to prevent scour to the riverbed and utilize the vegetation to dissipate flows.</i> 9. <i>Clay bunds will be formed across the stream, both upstream and downstream beyond the extent of the required foundations. Channels will be excavated across the stream with any riverbed gravels set aside for future reinstatement of the culvert bed. Clay bunds will then be constructed, integrating the pipe both upstream and downstream.</i> 		
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			<ol style="list-style-type: none"> 10. The pipe will extend beyond the bund and graded out to both inlet and outlet utilizing any available gravel as a temporary bed in proximity to the pipe. 11. The bunds both upstream and downstream will extend to the embankments on either side enclosing the works area. Rock armour will be installed if necessary both upstream and downstream to protect the pipe from undermining. 12. Excavation will proceed adjacent to the existing pipe benching down to formation whilst maintaining the existing pipe in place. Inspections and testing if required will be carried out to confirm suitable bearing capacity. 13. Sumps consisting of vertical pipes surrounded with clean stone will be installed within the excavations to direct any water ingress and allow dewatering of the works area. 14. Water will be pumped through hoses to a settlement tank to discharge through a silt sock prior to reaching the existing field drainage system. 15. Over-pumping arrangements will be put in place with flows directed downstream. 16. The existing pipes will be removed whilst maintaining the bunds. 17. Existing stream bed will be maintained. 18. New drainage pipes will be laid at the existing fall. New drainage stone Cl. 505 or similar will be used as a surround around the new pipes. 19. Excavation will be backed filled and compacted in layers up to the required level. 20. All areas adjacent to the works will be reinstated. <p>A constraint/buffer zone will be maintained for all crossing locations where possible. In addition, measures which are outlined below will be implemented to ensure that silt laden or contaminated surface water runoff from the excavation work does not discharge directly to the watercourse.</p>		
MM33	Culvert Crossing	EIAR Chapter 4, 9.	<p>➤ All new proposed culverts and proposed culvert upgrades at field drain crossings required for the Proposed Wind Farm will be suitably sized for the expected peak flows in the watercourse. Some culverts may be installed to manage drainage waters from works areas of the Proposed Wind Farm, particularly where the waters must be taken from one side of an existing roadway to the other for discharge. The size of culverts will be influenced by</p>		

		Appendix 4-4	<p>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.</p> <p>> 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.</p> <p>> All culverts will be inspected regularly to ensure they are not blocked by debris, vegetation or any other material that may impede conveyance.</p>		
MM34	Silt Fences	EIAR Chapter 4 Appendix 4-4	<p>> Silt fences will be installed as an additional water protection measure around existing watercourses in certain locations, particularly where works are proposed within the 50m buffer zone of a stream. Installation locations will be confirmed during the finalisation of detailed drainage design following a pre-construction survey by the appointed contractor.</p> <p>> 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 '<i>Control of Water Pollution from Linear Construction Projects</i>' published by CIRIA (No. C648, 2006). Silt fence material will comprise Terrastop™ Premium material, and silt fences will be installed per the manufacturer's guidelines. Silt fences will be inspected on a regular basis to ensure that they are operating effectively.</p>		
MM35	Sedimats	EIAR Chapter 4	<p>> 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.</p>		
MM36	Internal Cabling Trench	EIAR Chapter 4	<p>> Cable trenches are proposed to be constructed in short, controlled sections, thereby minimising the amount of ground disturbed at any one time and minimising the potential for drainage runoff to pick up silt or suspended solids. Each short section of trench is</p>		

		Appendix 4-4	<p>excavated, ducting installed and bedded, and backfilled with the appropriate materials, before work on the next section commences. This operation normally occurs over a period of 2-4 hours.</p> <ul style="list-style-type: none"> › To efficiently control drainage runoff from cable trench works areas, excavated material is stored on the up-gradient side of the trench and is temporarily sealed/smoothed over, using the back of the excavator bucket. Should any rainfall cause runoff from the excavated material, the material is therefore collected and contained in the downgradient cable trench. › Excess subsoil is removed from the cable trench works area immediately upon excavation, and in the case of the Proposed Project, would be transported to one of the on-site borrow pit storage areas or used for landscaping and reinstatements of other areas elsewhere onsite. › Any underground services encountered along the internal cabling trench where it is located within the public road corridor (i.e., the L7002 crossing) will be surveyed for level and the ducting will pass over the service provided adequate cover is available. › A minimum clearance of 300 mm will be required between the bottom of the ducts and the service in question. If the clearance cannot be achieved the ducting will pass under the service and again a 300 mm clearance between the top of the communications duct and bottom of the service will be achieved. In deeper excavations an additional layer of marker tape will be installed between the communications duct and top-level yellow marker tape. › If the required separation distances cannot be achieved then a number of alternative options are available such as using steel plates laid across the width of the trench and using 35N concrete surrounding the proposed ducting, with marker tape on the side of the trench. Back fill around any utility services will be with dead sand/pea shingle where appropriate. 		
MM37	Turbine/Met Mast Foundation Excavations	<p>EIAR Chapter 4</p> <p>Appendix 4-4</p>	<ul style="list-style-type: none"> › The extent of the excavation will be marked out and will include an allowance for trimming the sides of the excavation to provide a safe working area and slope batter; › Where practical, the soil will be stripped over the area of the excavation and stored locally for reuse, the subsoil will be excavated and stored to one side for reuse during the landscaping around the finished turbine; › No material will be removed from the Proposed Wind Farm with excavated peat and spoil being transported to the identified peat and spoil management areas within the site. 		

			<ul style="list-style-type: none"> ○ All groundwater and surface water arising from turbine base excavation will be pumped, via silt bags, to the dirty water system prior to discharge from the works area; ○ Peat and 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; <p>› All onsite buffers will be upheld: Buffers to be upheld – provided by the Project Hydrologist, Project Archaeologist, and Project Ecologist;</p> <p>› 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.</p>		
MM38	Peat and Spoil Management	<p>Appendix 4-3</p> <p>Appendix 4-4</p> <p>Appendix 8-1</p>	<p>As identified in the Peat and Spoil Management Plan (Appendix 4-3), the following recommendations/best practice guidelines for the placement of peat alongside the proposed infrastructure elements should be considered and taken into account during construction:</p> <ul style="list-style-type: none"> › All excavated peat will be placed/spread alongside the proposed infrastructure elements on site, where possible. › The peat placed adjacent to the proposed infrastructure elements should be restricted to a maximum height of 1.5m over a 10m wide corridor on both sides of the proposed infrastructure elements. It should be noted that the designer should define/confirm the maximum restricted height for the placed peat. › The placement of excavated peat and spoil is to be avoided without first establishing the adequacy of the ground to support the load. The placement of peat within the placement areas will likely require the use of long reach excavators, low ground pressure machinery and possibly bog mats in particular for drainage works. › Where there is any doubt as to the stability of the peat surface then no material shall be placed on to the peat surface. The risk of peat instability is reduced by not placing any loading onto the peat surface. › The surface of the placed peat will be shaped to allow efficient run-off of surface water. Where possible, shaping of the surface of the peat should be carried out as placement of peat within the placement area progresses. This will reduce the likelihood of debris run-off and ensure stability of the placed peat. 		

			<ul style="list-style-type: none"> › Finished/shaped side slopes in the placed peat shall be not greater than 1 (v): 3 (h). This slope inclination will be reviewed during construction, as appropriate. Where areas of weaker peat and spoil are encountered then slacker slopes will be required. › The acrotelm (if encountered) shall be placed with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the placed peat within the placement areas. › Movement monitoring instrumentation may be required adjacent to the internal road where peat has been placed. The locations where monitoring is required will be identified by the designer onsite. › An interceptor drain will be installed upslope of the designated peat placement areas to divert any surface water away from these areas. This will reduce the likelihood of debris runoff. › All the above-mentioned general guidelines and requirements should be confirmed by the designer prior to construction. › To minimise the risk of construction activity causing potential peat instability the Construction Method Statements (CMSs) for the project will take into account, but not be limited, to the recommendations above. This will ensure that best practice guidance regarding the management of peat stability will be inherent in the construction phase. 		
MM39	Temporary Construction Compound	EIAR Chapter 4 Appendix 4-4	<ul style="list-style-type: none"> › Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by an appropriately consented waste collector to wastewater treatment plants site. The water supply to the site will be from a temporary water storage tank which will be filled using a mobile water tank which will source water locally as required. › The area to be used as the compound will be marked out at the corners using ranging rods or timber posts. Drainage runs, and associated settlement ponds will be installed around the perimeter; › The proposed 5 no. temporary construction compounds will consist of: bunded refuelling and containment area for the storage of lubricants, oils, and site generators, etc., full retention oil interceptor, storage area (including waste and recycling areas), temporary site offices, staff facilities, and car-parking areas for staff and visitors. 		

			<p>› If necessary, the compound will be fenced and secured with locked gates, although fencing would only be utilised where significant risk of danger to third parties or vandalism is envisaged.</p>		
Operational Phase					
MM40	Wastewater Management	EIAR Chapter 4	<p>› The proposed wastewater storage tanks at the proposed onsite 220kV substation will be fitted with an automated alarm system that will provide sufficient notice that the tank requires emptying. The wastewater storage tank alarm will be part of a continuous stream of data from the wind turbines, wind measurement devices and electricity substation that will be monitored remotely 24 hours per day, 7 days per week. Only waste collectors holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007 (as amended), will be employed to transport wastewater away from the site.</p>		
MM41	Proposed Onsite 220kV Substation	EIAR Chapter 4	<p>› The proposed onsite 220kV substation compound will be bunded appropriately to 110% of the volume of oils that will be stored, and to prevent leakage of any associated chemicals to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor.</p>		
Decommissioning Phase					
MM42	Decommissioning	EIAR Chapter 4 Appendix 4-8	<p>› A Decommissioning Plan has been prepared (Appendix 4-8) the detail of which will be agreed with the Local Authority prior to any decommissioning. The Decommissioning Plan will be updated prior to the end of the operational period in line with decommissioning methodologies that may exist at the time and will agree with the Planning Authority at that time. The potential for effects during the decommissioning phase of the Proposed Project has been fully assessed in the EIAR.</p>		
MM43	Decommissioning	EIAR Chapter 4	<p>› Upon decommissioning of the Proposed Wind Farm, the wind turbines will be disassembled in the reverse order to how they were erected. The turbines will be disassembled with a similar model of crane that was used for their erection. The turbines will be removed from site using the same transport methodology adopted for delivery to</p>		

		Appendix 4-8	<p>site initially. The turbine materials will be transferred to a suitable recycling or recovery facility.</p> <ul style="list-style-type: none"> > The underground electrical cabling connecting the proposed turbines to the proposed onsite 220kV substation will be removed from the cable ducts and any direct buried cables will be cut and left in situ. The cabling will be pulled from the cable ducts using a mechanical winch which will extract the cable and re-roll it on to a cable drum. This will be undertaken at the original cable jointing pits which will be excavated using a mechanical excavator and will be fully re-instated once the cables are removed. > The cable ducting will be left in situ as it is considered the most environmentally prudent option, avoiding unnecessary excavation and soil disturbance. The cable materials will be transferred to a suitable recycling or recovery facility. The Proposed Grid Connection and proposed onsite 220kV substation will remain in place as it will be under the ownership and control of the ESB Networks and/or EirGrid and will form a permanent part of the national electricity grid. 		
MM44	Refuelling	EIAR Chapter 4, 8, 9 Appendix 4-8	<ul style="list-style-type: none"> > Road-going vehicles will be refuelled off-site wherever possible. > On-site refuelling of machinery will be carried out at dedicated refuelling locations using a mobile double-skinned fuel bowser. > 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 an appropriately bounded area when not in use and only designated trained and competent operatives will be authorised to refuel plant on site. > 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. <p>The following mitigation measures are proposed to avoid release of hydrocarbons at the site:</p>		

			<ul style="list-style-type: none"> > All plant will be inspected and certified to ensure that they are leak free and in good working order prior to use at the site. > Fuels stored on site will be minimised. > Onsite refuelling will be carried out by trained personnel only; > All refuelling will be carried out outside of the designated hydrological buffer zones; > Mobile measures such as dip trays and fuel absorbent mats will be used during refuelling operations as required; > All plant and machinery will be equipped with fuel absorbent material and pads to deal with any accidental spillage; > Spill kits will be available to deal with any accidental spillage in and outside the re-fuelling area. > An emergency plan for the decommissioning phase to deal with accidental spillages will be developed (refer to Section 5 of the Decommissioning Plan, Appendix 4-8); > 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; > Hazardous wastes will be kept separate from non-hazardous wastes so that contamination does not occur. 		
EIAR Chapter 5: Population and Human Health					
Pre-construction Phase					
MM45	Human Health	EIAR Chapter 5	<ul style="list-style-type: none"> > Prior to commencement of any works, the occupants of dwellings in the vicinity of the proposed works will be contacted and the scheduling of works will be made known. Local access to properties will also be maintained throughout any construction works and local residents will be supplied with the number of the works supervisor in order to ensure that disruption will be kept to a minimum. 		
MM46	Traffic and Transport	EIAR Chapter 5	A Traffic Management Plan (TMP) has been developed in order to minimise any potential effect on the local population during the construction phase of the Proposed Project due to traffic.		

Construction Phase					
MM47	Human Health	<p>EIAR Chapter 5</p> <p>Appendix 4-4</p>	<p>The Proposed Project will be constructed in accordance with all relevant Health and Safety Legislation, including:</p> <ul style="list-style-type: none"> › Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005); › Safety, Health and Welfare at Work (General Application) (Amendment) Regulations 2016 (S.I. No. 36 of 2016); › S.I. No. 528/2021 - Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021 and › Safety, Health and Welfare at Work (General Application) Regulations 2007 to 2023. <p>The following mitigation measures are detailed below:</p> <ul style="list-style-type: none"> › A Health and Safety Plan covering all aspects of the construction process will address the Health and Safety requirements in detail. This will be prepared on a preliminary basis at the procurement stage and developed further at construction stage. › All hazards will be identified and risks assessed. Where elimination of the risk is not feasible, appropriate mitigation and/or control measures will be established. The contractor will be obliged under the construction contract and current health and safety legislation to adequately provide for all hazards and risks associated with the construction phase of the project. SafePass registration cards are required for all construction, delivery and security staff. Construction operatives will hold a valid Construction Skills Certificate Scheme card where required. The developer is required to ensure a competent contractor is appointed to carry out the construction works. The contractor will be responsible for the implementation of procedures outlined in the Safety and Health Plan. Public safety will be addressed by restricting site access during construction. Fencing will be erected in areas of the site where uncontrolled access is not permitted. › Appropriate warning signs will be posted, directing all visitors to the site manager. › Goal posts will be established, where necessary, under overhead electricity lines for the entirety of the construction phase of the Proposed Project. › The suitability of machinery and equipment for use near power lines will be risk assessed. 		

		<ul style="list-style-type: none"> › All staff will be trained on operating voltages of overhead electricity lines running over the site. All staff will be trained to be aware of the risks associated with overhead lines. All contractors that may visit the site are made aware of the location of lines before they come on to site. › Barriers will run parallel to the overhead line at a minimum horizontal distance of 6 m on plan from the nearest overhead line conductor wire. › When activities must be carried out beneath overhead lines, e.g., component delivery or substation construction, a site-specific risk assessment will be undertaken prior to any works. The risk assessment must take into account the maximum potential height that can be reached by the plant or equipment that will be used prior to any works. Overhead line proximity detection equipment will be fitted to machinery when such works are required. › Information on safe clearances will be provided to all staff and visitors. › Signage indicating locations and health and safety measures regarding overhead lines will be erected in canteens and onsite. › All staff will be made aware of and adhere to the Health & Safety Authority’s ‘Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2013 to 2021’. This will encompass the use of all necessary Personal Protective Equipment and adherence to the Site Health and Safety Plan. <p>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’.</p> <p>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):</p> <ul style="list-style-type: none"> › 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; 		
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			<ul style="list-style-type: none"> > 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. <p>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):</p> <ul style="list-style-type: none"> > Development of the Safety and Health Plan for the construction stage, with updating where required as work progresses; > Compile and develop safety file information; > Reporting of accidents / incidents; > Weekly site meeting with PSCS; > Coordinate arrangements for checking the implementation of safe working procedures. > Ensure that the following are being carried out: > Induction of all site staff including any new staff enlisted for the project from time to time; > Toolbox talks as necessary; > Maintenance of a file which lists personnel on site, their name, nationality, current Safe Pass number, current Construction Skills Certification Scheme (CSCS) card (where relevant) and induction date; > Report on site activities to include but not limited to information on accidents and incidents, disciplinary action taken and PPE compliance; > Monitor the compliance of contractors and others and take corrective action where necessary; and > Notify the Authority and the client of non-compliance with any written directions issued. 		
MM48	Air Quality: Dust Emissions	EIAR Chapter 5, 10	<ul style="list-style-type: none"> > A wheelwash facility will be installed on the Proposed Wind Farm at all proposed construction site entrance and will be used by vehicles before leaving the site. 		

		<p>Appendix 4-4</p>	<ul style="list-style-type: none"> › Sporadic wetting of loose stone surface will be carried out during the construction phase to minimise movement of dust particles to the air. In periods of extended dry weather, dust suppression may be necessary along haul roads, site roads, grid route, road widening sections, substation, and construction compounds and around the borrow pit area to ensure dust does not cause a nuisance. › If necessary, such as during periods of dry weather, de-silted water will be taken from settlement ponds in the site's drainage system and will be pumped into a bowser or water spreader to dampen down haul roads, turbine bases, borrow pit and site compounds to prevent the generation of dust where required. › Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff as outlined in the CEMP (Appendix 4-4). › Areas of excavation will be kept to a minimum and stockpiling of excavated material will be minimised by coordinating excavation, placement of material in peat placement areas and restoration of borrow pits. › Turbines components, construction materials and grid connection infrastructure will be transported to the site on specified haul routes only, as agreed with the local authority. › The agreed haul route roads adjacent to the site will be regularly inspected for cleanliness and cleaned as deemed necessary by the construction Site Supervisor/Site Manager. › The transport of construction materials may have the potential to generate dust in dry weather conditions. Roads will be watered down to suppress dust particles in the air as deemed necessary by the Site Supervisor/Manager. › The transport of dry excavated material from the on-site borrow pits, which may have potential to generate dust will be minimised. If necessary, such as in periods of dry weather, excavated material will be dampened prior to transport from the borrow pits. › Waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. › The MRF facility will be local to the site to reduce dust emissions associated with vehicle movements. The nearest licensed waste facility is located approximately 19.4km southeast of the Proposed Project site. › A CEMP will be in place throughout the construction phase. The CEMP includes dust suppression measures. 		
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MM49	Air Quality: Exhaust Emissions	EIAR Chapter 5, 10	<ul style="list-style-type: none"> › All construction vehicles and plant used during construction will be maintained in good operational order while onsite. If any vehicle requires repair, this work will be carried out, thereby minimising any emissions that arise. › Turbines components will be transported to the site on specified routes only, unless otherwise agreed with the Planning Authority. › All machinery will be switched off when not in use. › Construction staff will be trained how to inspect and maintain construction vehicles and plant to ensure good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required. › The majority of aggregate materials for the construction of the Proposed Project will be obtained from the borrow pits on site. This will significantly reduce the number of delivery vehicles accessing the site, thereby reducing the amount of emissions associated with vehicle movements. › The expected waste volumes generated onsite are unlikely to be large enough to warrant source segregation at the site. Therefore, all wastes streams generated onsite will be deposited into a single waste skip which will be covered. This waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The Materials Recovery Facility (MRF) will be local to the Proposed Project site to reduce the amount of exhaust emissions associated with vehicle movements. The nearest licensed waste facility is located approximately 19.4km southeast of the Proposed Project site. › A CEMP will be in place throughout the construction phase (see Appendix 4-4). The CEMP includes measures to reduce exhaust emissions. 		
MM50	Climate	Chapter 5, 11	<ul style="list-style-type: none"> › Construction staff will be trained how to inspect and maintain construction vehicles and plant to ensure good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required. › All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise. 		

			<ul style="list-style-type: none"> › When stationary, delivery and on-site vehicles will be required to turn off engines. › Turbines and construction materials will be transported to the site on specified routes only unless otherwise agreed with the Planning Authority. Please see Section 15.1.6 of Chapter 15: Material Assets for details. › It is intended to obtain the majority of materials for the construction of the Proposed Project from the proposed onsite borrow pits, with some material being imported from local licenced quarries as needed. This will significantly reduce the number of delivery vehicles accessing the site, thereby reducing the emissions associated with vehicle movements. › A CEMP (Appendix 4-4) will be in place throughout the construction phase. › The CEMP includes a Resource Waste Management Plant (RWMP) which outlines the best practice procedures that will occur during the construction phase relating to waste material. › The RWMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of construction of the Proposed Project. Disposal of waste will be seen as a last resort. › Section 4.5.7 of Chapter 4 of this EIAR refers to the methodology that will be utilised to manage onsite waste. This waste material will be transferred to a licensed/permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor. › The MRF facility will be local to the Proposed Project site to reduce the amount of emissions associated with vehicle movements. Derryclure Civic Amenity Site is the closest MRF to the Proposed Project and is approximately 19.4km southeast of the Proposed Wind Farm. › Where applicable, low-carbon intensive construction materials will be sourced and utilised onsite. 		
MM51	Noise and Vibration	Chapter 5, 12 Appendix 4-4	<p>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’</p> <p>The following proposed measures to control noise will be implemented in full:</p>		

		<ul style="list-style-type: none"> › Limiting the hours during which site activities likely to create high levels of noise or vibration are permitted; › Establishing channels of communication between the contractor/developer, Local Authority and residents; › Monitoring typical levels of noise and vibration during critical periods and at sensitive locations; › Selection of plant with low inherent potential for generation of noise and/ or vibration where practical; › Placing of noise generating / vibratory plant as far away from sensitive properties as practical within the site constraints, and; › The hours of construction activity will be limited to avoid unsociable hours where possible. Works operations shall generally be restricted to between 7:00hrs and 19:00hrs Monday to Friday and Saturday between 7:00hrs and 13:00hrs. However, to ensure that optimal use is made of good weather periods or at critical periods within the programme (e.g., concrete pours) or to accommodate delivery of large turbine components along public routes it could be necessary on occasion to work outside of these hours. Any such out of hours working will be agreed in advance with the Local Authority. <p>And more specifically:</p> <ul style="list-style-type: none"> › 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. 		
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			<p>Where rock breaking is employed in relation to the Proposed Project, the following are examples of measures that will be employed, where necessary, to mitigate noise emissions from these activities:</p> <ul style="list-style-type: none"> > Fit suitably designed muffler or sound reduction equipment to the rock-breaking tool to reduce noise without impairing machine efficiency; > Ensure all leaks in air lines are sealed; > Erect acoustic screen between compressor or generator and noise sensitive area; > When possible, line of sight between top of machine and reception point needs to be obscured; > Enclose breaker or rock drill in portable or fixed acoustic enclosure with suitable ventilation; > Air overpressure from a blast is difficult to control because of its variability, however, much can be done to reduce the effect. A reduction in the amount of primer cord used, together with the adequate burial of any that is above the ground, can give dramatic reduction to air overpressure intensities especially in the audible frequency range. Most complaints are likely to be received from an area downwind of the blast site, and therefore, if air blast complaints are a continual problem, it would be advisable to postpone blasting during unfavourable weather conditions if possible. As air blast intensity is a function of total charge weight, then a reduction in the total amount of explosives used can also reduce the air overpressure value; > Further guidance will be obtained from the recommendations contained within BS5228: Part 1 and the European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations 1988 in relation to blasting operations. 		
MM52	Major Accidents and Natural Disasters	<p>EIAR Chapter 5, 8, 9, 16</p> <p>Appendix 4-4</p>	<ul style="list-style-type: none"> > The Proposed Project is designed and will be constructed in line with current best practice and, as such, mitigation against the risk of major accidents and/or disasters will be embedded through the design. In accordance with the provision of the European Commission ‘<i>Guidance on the preparation of Environmental Impact Assessment Reports</i>’ 2017, a Risk Management Plan will be prepared and implemented on site to ensure an effective response to disasters or the risk of accidents. The plan will include sufficient preparedness and emergency planning measures. 		

			<ul style="list-style-type: none"> > . The mitigation measures outlined therein to protect environmental receptors as well as the procedures and measures described in the CEMP (see Appendix 4-4) will ensure that the risk from these sources is low. > A CEMP has been prepared for the Proposed Project. Upon a grant of planning permission for the Proposed Project, the CEMP will be updated prior to the commencement of the development. The CEMP will be a live document maintained by the contractor that will work to ensure that potential risks of major accident and/or disaster are identified, avoided, and mitigated, as necessary. Refer to Appendix 4-4 for the CEMP that sets out the minimum standards to be employed by the contractor 		
Operational Phase					
MM53	Property Values	EIAR Chapter 5, 10, 12, 14	<ul style="list-style-type: none"> > All mitigation relevant to property values, outlined above and the corresponding chapters: Chapter 10: Air Quality, Chapter 12: Noise and Vibration, Chapter 14: Landscape and Visual, and Chapter 15: Material Assets, will be implemented to reduce insofar as possible, impacts on property values at properties located in the vicinity of Proposed Wind Farm > 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). 		
MM54	Human Health	EIAR Chapter 5	<ul style="list-style-type: none"> > Access to the turbines is through a door at the base of the structure, which will be locked at all times outside maintenance visits. The doors will only be unlocked as required for entry by authorised personnel and will be locked again following their exit. > Signs will be erected at suitable locations such as, amenity access points and carparks, setting out the conditions of public access under the relevant legislation and providing normal hours and out of hours contact details. Staff associated with the project will conduct frequent visits, which will include inspections to establish whether any signs have been defaced, removed, faded, or are becoming hidden by vegetation or foliage, with prompt action taken as necessary. > Signs will also be erected at suitable locations across the site as required for the ease and safety of operation of the wind farm. These signs include: <ul style="list-style-type: none"> ○ Buried cable route markers at 50m (maximum) intervals and change of cable route direction; 		

			<ul style="list-style-type: none"> ○ Directions to relevant turbines at junctions; ○ “No access to Unauthorised Personnel” at appropriate locations; ○ Speed limits sign at site entrance and junctions; ○ “Warning these Premises are alarmed” at appropriate locations; ○ “Danger HV” at appropriate locations; ○ “Warning – Keep clear of structures during electrical storms, high winds or ice conditions” at site entrance; ○ “No unauthorised vehicles beyond this point” at specific site entrances; and ○ Other operational signage required as per Site-specific hazards. <p>› The proposed onsite 220kV substation, which will be operated by EirGrid will be locked and fenced off from public access. The proposed onsite 220kV substation will be operational remotely and manually 24 hours per day, 7 days a week. Supervisory operational and monitoring activities will be carried out remotely using a SCADA system, with the aid of computers connected via a telephone modem link.</p> <p>› Periodic service and maintenance work which include some vehicle movement.</p> <p>› For operational and inspection purposes, substation access is required.</p> <p>› Servicing of the substation equipment will be carried out in accordance with the manufacturer’s specifications, which would be expected to entail the following:</p> <ul style="list-style-type: none"> ○ Six-month service – three-week visit; ○ Annual service – six-week visit; ○ Weekly visits as required. 		
MM55	Shadow Flicker	EIAR Chapter 5	<p>Where daily shadow flicker exceedances have been predicted at buildings by the modelling software, a site visit will be undertaken firstly to determine the level of occurrence, existing screening and window orientation. This will determine if the receptor has an actual line of sight to any turbine and actual potential for shadow flicker to occur. Once this exercise is completed and all the potentially affected properties, the following measures will be employed.</p> <p>Wind Turbine Control Measures</p> <p>If it is not possible to mitigate any identified shadow flicker limit exceedance locally using the measures detailed in Section 5.8.3.2.8 of Chapter 5, wind turbine control measures will be implemented.</p>		

		<p>Wind turbines can be fitted with shadow flicker control units to allow the turbines to be controlled to prevent the occurrence of shadow flicker at properties surrounding the wind farm. The shadow flicker control units will be added to any required turbines and are not cost-prohibitive.</p> <p>A shadow flicker control unit allows a wind farm's turbines to be programmed and controlled using the wind farm's SCADA control system to change a particular turbine's operating mode during certain conditions or times or even turn the turbine off if necessary.</p> <p>All predicted incidents of shadow flicker can be pre-programmed into the wind farm's control software. The wind farm's SCADA control system can be programmed to shut down any particular turbine at any particular time on any given day to ensure that shadow flickers occurrences at properties which are not naturally screened or cannot be screened with measures outlined above. Where such wind turbine control measures are to be utilised, they need only be implemented when the specific combined circumstances occur that are necessary to give rise to the shadow flicker effect in the first instance.</p> <p>The atmospheric variables that determine whether shadow flicker will occur or not are continuously monitored at the wind farm site and the data fed into the wind farm's SCADA control system. The strength of direct sunlight is measured by way of photocells, and if the sunlight is of sufficient strength to cast a shadow, the shadow flicker control mechanisms come into effect. Wind speed and direction are measured by anemometers and wind vanes on each turbine and on the wind farm's met mast, and similarly, and if wind speed and direction is such that a shadow will be cast, the shadow flicker control mechanisms come into effect. The moving blades of the turbine will require a short period of time to cease rotating and as such there may be a very short period (less than 3 to 5 minutes) during which the blades are slowed to a complete halt. The turbines giving rise to shadow flicker may be turned off on different days to prevent excessive wear and tear on any single turbine.</p> <p>To ensure that the model and SCADA system is accurate and working well a site visit will be carried out to verify the system. The shadow flicker prediction data will be used to select dates</p>		
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			<p>on which a shadow flicker event could be observed at one or multiple affected properties and the following process will be adhered to.</p> <ol style="list-style-type: none"> 1. <i>Recording the weather conditions at the time of the site visit, including wind speeds and direction (i.e., blue sky, intermittent clouds, overcast, moderate breeze, light breeze, still, etc.).</i> 2. <i>Recording the house number, time and duration of site visit and the observation point GPS coordinates.</i> 3. <i>Recording the nature of the sensitive receptor, its orientation, windows, landscaping in the vicinity, any elements of the built environment in the vicinity, vegetation.</i> 4. <i>In the event of shadow flicker being noted as occurring the details of the duration (times) of the occurrence will be recorded.</i> 5. <i>The data will then be sent to the wind farm operational team to confirm that the model and SCADA system are working.</i> 6. <i>Following 12 months of full operation of the Proposed Project a report can be prepared for the Local Authority describing the shadow flicker mitigation measures used at the wind farm and confirming the implementation and successful operation of the system.</i> <p>This method of shadow flicker mitigation has been technically well-proven at wind farms in Ireland and in areas outside Ireland that experience significantly longer periods of direct sunlight. In order to demonstrate how the SCADA control system can be applied to switch off particular turbines at the relevant times and dates, Table 5-10 in Chapter 5 lists the 58 no. sensitive receptors at which a shadow flicker mitigation strategy may be necessary to ensure the DoEHLG 2006 Guidelines 30-minute per day shadow flicker threshold is not exceeded. In this case, the relevant turbine(s) would be programmed to switch off for the time required to reduce daily shadow flicker to below the guideline limit of 30 minutes. The SCADA control system would be utilised to control shadow flicker in the absence of being able to agree alternative mitigation measures with the relevant property owner. The mitigation strategy outlined in Section 5.8.3.2.8 in Chapter 5 is based on the theoretical precautionary scenario. The details presented in Table 5-10 list the days per year and the turbines that could be programmed to switch off at specific times, in order to reduce daily shadow flicker to a maximum of 28 minutes</p>		
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			<p>which is below the DoEHLG 2006 Guidelines limit of 30 minutes.</p> <p>This measure will be utilised at the Proposed Wind Farm to prevent incidences of shadow flicker at any house if required. Therefore, the Proposed Wind Farm could be brought in line with the requirements of the Draft DoHPLG 2019 Guidelines should they come into force during the planning application process for this development.</p> <p>Should a complaint be received within 12 months of commissioning of the Proposed Wind Farm, field investigation/monitoring will be carried out by the wind farm operator at the affected property. Notwithstanding the approach set out above should shadow flicker associated with the permitted development be perceived to cause a nuisance at any home, the affected homeowner is invited to engage with the Applicant. The homeowner will be asked to log the date, time and duration of shadow flicker events occurring on at least five different days. The provided log will be compared with the predicted occurrence of shadow flicker at the residence, and if necessary, a field investigation will be carried out.</p> <p>Screening Measures</p> <p>In the event of an occurrence of shadow flicker exceeding guideline threshold values of 30 minutes per day at residential receptor locations, mitigation options will be discussed with the affected homeowner, including:</p> <ul style="list-style-type: none"> > Installation of appropriate window blinds in the affected rooms of the residence; > Planting of screening vegetation; > Other site-specific measures which might be agreeable to the affected party and may lead to the desired mitigation. > If agreement can be reached with the homeowner, then it would be arranged for the required mitigation to be implemented in cooperation with the affected party as soon as practically possible and for the full costs to be borne by the wind farm operator. 		
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MM56	Air Quality: Dust and Exhaust Emissions	EIAR Chapter 5, 10	<ul style="list-style-type: none"> › Any vehicles or plant brought onsite during the operational phase will be maintained in good operational order that comply with the Road Traffic Acts 1961 as amended, thereby minimising any emissions that arise. › When stationary, delivery and on-site vehicles will be required to turn off engines. › Waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. <ul style="list-style-type: none"> ○ The MRF facility will be local to the site to reduce the emissions associated with vehicle movements. The nearest licensed waste facility is located approximately 19.4km southeast of the Proposed Project site. › Amenity carparks are spread out throughout the Proposed Wind Farm thus minimising the potential for traffic delays due to congestion building up at site entrance points and consequently further exhaust emissions. 		
MM57	Climate	EIAR Chapter 5, 11	<ul style="list-style-type: none"> › Ensure that all maintenance and monitoring vehicles will be maintained in good operational order while onsite, and, when stationary, be required to turn off engines thereby minimising any emissions that arise. 		
MM58	Noise and Vibration	EIAR Chapter 5, 12 Appendix 12-6	<p>In the event of a complaint indicating potential excessive amplitude modulation or tonality associated with the Proposed Project, the Developer will fully investigate the complaint through review of the meteorological periods and conditions during which the reported AM or tonality occurs. A noise monitoring protocol would be established, in consultation with the relevant local authorities, which would set out the location and analysis methodology to be employed for the noise monitoring (Refer to Section 12.6.4.2). This can be secured via a planning condition.</p> <p>If an ongoing issue with Excessive AM is established, a mitigation strategy to reduce the level of AM will be implemented through engineering methods, operational changes and/or curtailment of specific turbines. The operator would first appoint a qualified acoustic consultant to objectively assess the level of AM in accordance with the methods outlined in the Institute of Acoustics IOA Noise Working Group (Wind Turbine Noise) Amplitude Modulation Working</p>		

			<p>Group Final Report: A Method for Rating Amplitude Modulation in Wind Turbine Noise (9 August 2016) or subsequent revisions.</p> <p>The measurement method outlined in the IOA AMWG document, known as the ‘Reference Method’, provide a robust and reliable indicator of AM and yield important objective information on the frequency and duration of occurrence, which can be used to evaluate different operational conditions including methods, determined to minimise the occurrence of excessive AM. These mitigation measures, if required, will consist of either turbine blade modifications or the implementation of operational controls for the relevant turbine type, which will include operating turbines in different operational modes or turbine curtailment under specific operational conditions and may in very unlikely circumstance require turning specific turbine off under certain conditions. The aim of the mitigation would be to minimise adverse impacts from excessive AM associated with the proposed project as much as is reasonably practicable.</p> <p>If the complaints suggest the potential occurrence of clearly audible tonality in the wind turbine noise, the audibility of the tones will be investigated from measured data with a robust, objective method such as that included in ISO 1996-2:2017 with modifications in IEC 61400-11-2. If the rated level of the wind farm is above the limit, then the operator would investigate and implement measures to reduce the rated level to below the limit. This may involve engineering methods, operational changes and/or (in very unlikely circumstance) curtailment of specific turbines.</p> <p>The commitment outlined to control amplitude modulation (AM) from wind turbines are considered best practice. The proposed approach provides a clear commitment that additional adverse impacts from excessive amplitude modulation (AM) or tonality associated with the operation of the proposed project will be effectively managed and minimised by the operator</p>		
MM59	Major Accidents	Chapter 16	Mitigation measures have been outlined in Section 5.8.2.2.7 in Chapter 5, and in Chapter 8: Land, Soils and Geology, Chapter 9: Water and Chapter 16: Major Accidents and Natural Disasters		
Decommissioning Phase					

MM60	Decommissioning Phase	EIAR Chapter 5,4	<p>The wind turbines proposed as part of the Proposed Project are expected to have a lifespan of approximately 35 years. Following the end of their useful life, the wind turbines may be replaced with a new set of turbines, subject to planning permission being obtained, or the site may be decommissioned fully. The substation will remain in place as it will be under the ownership of ESB/EirGrid.</p> <p>The works required during the decommissioning phase are described in Section 4.13 in Chapter 4 of the EIAR. Any impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration, and the mitigation measures outlined above will be implemented during the decommissioning phase also. A Decommissioning Plan has been prepared as part of this EIAR and is included as Appendix 4-8. This Decommissioning Plan follows the most up to date NatureScot guidance. By its nature, the Decommissioning Plan is a working document and, in accordance with the NatureScot guidance, an updated Decommissioning Plan will be agreed with the local authorities three months prior to decommissioning the Proposed Project. The principles that will inform the final decommissioning plan are contained in the CEMP (see Appendix 4-4).</p>		
EIAR Chapter 6 Biodiversity					
Pre-construction					
MM61	Invasive Species Management	EIAR Chapter 6 Appendix 4-4	<p>A pre-commencement invasive species survey of the construction footprint will be undertaken by a qualified ecologist to determine if any invasive species have established on the site since the undertaking of the previous surveys. The treatment and control of invasive alien species if recorded will follow guidelines issued by the National Roads Authority – The Management of Invasive Alien Plant Species on National Roads – Technical Guidance (TII, 2020).</p> <p>No invasive species, listed on the Third Schedule of the S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011, were recorded within the Proposed Project site.</p>		

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

MM64	Bats	<p>ELAR Chapter 6</p> <p>Appendix 6-1</p> <p>Appendix 6-5</p>	<p>The below describes the best practice and site-specific mitigation measures that are in place to avoid and reduce the potential for significant effects on local bat populations.</p> <p><u>Noise Restriction</u> During the construction phase, plant machinery will be turned off when not in use and all plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (S.I. No. 632 of 2001, as amended).</p> <p><u>Lighting Restriction</u></p> <p>Where lighting is required, directional lighting will be used to prevent overspill on to woodland/forestry edges. Exterior lighting, during construction and post construction, shall be designed to minimize light spillage, thus reducing the effect on areas outside the Proposed Wind Farm, and consequently on bats i.e. Lighting will be directed away from mature trees/treelines around the periphery of the site to minimize disturbance to bats. Directional accessories can be used to direct light away from these features, e.g. through the use of light shields (Stone, 2013). The luminaries will be of the type that prevent upward spillage of light and minimize horizontal spillage away from the intended lands.</p> <p>The proposed lighting around the Proposed Project shall be designed with consideration of the Institute of Lighting Professionals Guidance Note 08/23 Bats and Artificial Lighting at Night (ILP, 2023).</p> <p>In addition, the Applicant commits to the use of lights during construction, operation and decommissioning (such that they are necessary) having consideration of the following guidance that is provided in the Dark Sky Ireland Lighting Principles:</p> <ul style="list-style-type: none"> › All lighting will be justified and used only when required. › Warm colour temperatures will be used to minimise impacts on wildlife and the night sky. › Glare and brightness will be minimised to protect visual comfort. › Luminaires will be angled downward with appropriate beam control to avoid over-lighting. › Lower mounting heights will be used where possible to better contain light. 		
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			<ul style="list-style-type: none"> › Lighting will incorporate timers, dimmers, or PIR sensors to reduce energy use and emissions. › Natural areas such as trees, waterbodies, and nesting habitats will not be illuminated. <p><u>Bat Buffers</u></p> <ul style="list-style-type: none"> › In accordance with NatureScot and NIEA Guidance, a minimum 50m buffer to all habitat features used by bats (e.g., hedgerows, tree lines etc.) should be applied to the siting of all wind turbines (See example provided in Plate 7-1 in Appendix 6-1). › NatureScot recommends that a distance of 50m between turbine blade tip and nearest woodland (or other key habitat features) is adequate mitigation. This 50m buffer will be implemented from the outset and monitored as per the post-construction monitoring. The success of the buffer mitigation will be assessed as part of post construction monitoring and updated where necessary. 		
MM65	Habitats	<p>EIAR Chapter 6, 9</p> <p>Appendix 6-5</p>	<p>Aquatic Habitats</p> <p>The pathways that would allow potential impacts to occur due to deterioration of water quality were considered in the design of the Proposed Project. The environmental management framework to be adhered to during the construction phase of the Proposed Project includes comprehensive detail regarding site set up, pollution prevention and hydrocarbon management and incorporates mitigating measures as detailed in Chapter 9 of the EIAR and in the CEMP in Appendix 4-4 to ensure that there is no significant effect on water quality or aquatic receptors within or downstream of the Proposed Project.</p> <p>The measures include the use of interceptor drains and collector drains to collect and intercept run-off from construction areas, temporary settlement ponds to attenuate and treat runoff, the use of silt fences between works and watercourses and dewatering silt bags to remove silts from pumped waters. The existing drainage system at the proposed site, which is operating in accordance with BnM’s IPC licence requirements, with environmental monitoring and silt control measures being implemented, will be maintained and expanded locally as required for use within the Proposed Project drainage system. The measures are outlined in full in Chapter 9.</p>		

			<p>While there will be no requirement for instream works (with the exception of artificial drains), all works adjacent to watercourses, will adhere to Inland Fisheries Ireland (IFI) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016).</p> <p>Uncut Raised Bog</p> <p>While the Proposed Project has been deliberately designed to minimise the loss of uncut raised bog within the site, there will be some loss of small areas of highly degraded remnants of this habitat due to upgrades of an existing track for future amenity use. Construction works associated with the amenity track upgrade will be confined to the defined works footprint, with appropriate controls in place to prevent encroachment into adjoining habitats. Prior to construction activities within or adjacent to this habitat, the works area will be demarcated and fenced off.</p> <p>No drainage works will be undertaken in proximity to raised bog habitat, and construction activities will be implemented in accordance with standard best-practice measures to prevent accidental disturbance or indirect impacts.</p>		
MM66	Flora and Fauna	EIAR Chapter 6	<p>Otter</p> <p>The pathways that would allow potential impacts to occur due to deterioration of water quality were considered in the design of the Proposed Project. A detailed drainage maintenance plan for the Proposed Project is provided in Section 4.9 of Chapter 4 of the EIAR. This plan provides details of how water quality will be protected during the construction of the Proposed Project. In addition to this, specific mitigation is provided in relation to water quality in Chapter 9 of this EIAR. The Construction Environmental Management Plan (CEMP) provided in Appendix 4-4 provides the details of how the measures will be implemented during construction.</p>		

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

Operational Phase					
MM68	Bats	<p>EIAR Chapter 6 Appendix 6-1</p>	<p>While High median activity was recorded at one location, it is noted that habitats at this location will change during the construction phase of the Proposed Project with the required implementation of the bat felling buffers. A monitoring and mitigation strategy has been devised for the Proposed Project, in line with the case study example provided in Appendix 5 of the NatureScot 2021 Guidance and based on the site-specific data. After year 1 monitoring, if a curtailment requirement is identified, a curtailment programme, in line with relevant guidelines, will be devised around key activity periods and weather parameters, as well as a potential increase in buffers if deemed necessary.</p> <p>Lighting</p> <p>The proposed lighting around the Proposed Project shall be designed with consideration of the Institute of Lighting Professionals Guidance Note 08/23 Bats and Artificial Lighting at Night (ILP, 2023).</p> <p>In addition, the Applicant commits to the use of lights during construction, operation and decommissioning (such that they are necessary) having consideration of the following guidance that is provided in the Dark Sky Ireland Lighting Principles:</p> <ul style="list-style-type: none"> > All lighting will be justified and used only when required. > Warm colour temperatures will be used to minimise impacts on wildlife and the night sky. > Glare and brightness will be minimised to protect visual comfort. > Luminaires will be angled downward with appropriate beam control to avoid over-lighting. > Lower mounting heights will be used where possible to better contain light. > Lighting will incorporate timers, dimmers, or PIR sensors to reduce energy use and emissions. > Natural areas such as trees, waterbodies, and nesting habitats will not be illuminated. <p>With regard to the potential for lighting to increase collision risk, it is noted that there will be limited illumination of the turbines in the form of aviation lighting. Post construction monitoring</p>		

		<p>will be carried out (as outlined below) to assess any potential changes in bat activity patterns and collision risk. Significant effects as a result of lighting are not anticipated; if, however, in the course of this monitoring, any potential for significant effects on bats is identified, the site-specific mitigation measures will be reviewed and any changes necessary will be implemented to avoid any such impacts.</p> <p>Bat Buffers</p> <p>In order to reduce the value of the habitat for bat species in the areas surrounding the turbines, a buffer of at least 50m between the tip of the blade and any trees or other tall vegetation that could provide high quality foraging habitat for bat species will be implemented. Details of this mitigation and how it is calculated is provided in Appendix 6-1. Given the proposed turbine dimensions (145m hub height) the clearance distance between the tip of the turbine blade and the nearest habitat feature is sufficient without implementing vegetation removal. However, on a precautionary basis, a 50m vegetation free buffer area will be applied and maintained.</p> <p>Blade feathering</p> <p>Feathering will be limited to periods and locations as follows:</p> <p>› Seasonal Application:</p> <p>Feathering will be applied during the main bat activity season (typically April–October) when bats are active and at potential increased risk of collision. Blade feathering will not be applied during winter months (November - March) when bats are largely inactive.</p> <p>› Spatial Targeting:</p> <p>Feathering will be implemented only at turbines located in areas of high or moderate bat activity, as identified through baseline surveys. Turbines positioned in habitats unsuitable for bats (e.g., extensive bare peat, exposed upland areas with no foraging or commuting value) will not require feathering at low wind speeds.</p>		
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			Should any variations in activity or risk levels be identified during post-construction monitoring that this will be adjusted accordingly as part of the mitigation and monitoring strategy.		
Decommissioning Phase					
MM69	Decommissioning Phase	EIAR Chapter 6 Appendix 4-8	<p>The same mitigation to prevent significant impacts on water quality and associated aquatic fauna and other terrestrial fauna during construction will be applicable to the decommissioning phase.</p> <p>Regarding Biodiversity at the site, the decommissioning phase will involve the following best practice mitigation measures:</p> <ul style="list-style-type: none"> › All measures to mitigate the risks of contamination of watercourses as highlighted in Chapters 8 and Chapter 9 of the EIAR will be fully implemented. › The areas within 50m of the hard-stand and turbine foundations will be subject to a pre-works terrestrial ecology walkover to highlight any constraints that may be present (e.g. breeding or resting places of protected species, presence of Invasive Plant Species, etc.). If any significant constraints are identified appropriate controls will be developed and integrated into the live decommissioning plan ahead of the commencement of work. › If any Third Schedule Invasive species are present in or adjacent to the works footprint, an Invasive Species Management Plan (ISMP) will be developed, and all recommendations implemented in accordance with the contemporary best practice measures. › Speed limits will be enforced on internal roads. › A detailed Traffic Management Plan (TMP) will be incorporated into the decommissioning plan which will ensure that the Proposed Project site is unaffected by traffic or storage of plant and materials. › All wastes will be stored in covered segregated containers and disposed of at licensed facilities. › No refuelling or other hydrocarbon-related usage will be undertaken within 50m of any watercourse in relation to maintenance vehicles, plant or machinery. › Any import of soil or fill necessary in the decommissioning process shall be from approved sources and appropriately tested or inspected to minimise the risk of import of 		

			invasive species. Only soil appropriate to the site (pH, soil type) will be used. The re-seeding or natural revegetation of reinstated areas will proceed on the advice of a suitably qualified ecologist. Any seed mix used will be on the approval of the ecologist.		
EIAR Chapter 7 Birds					
Pre-Construction Phase					
MM70	Birds	EIAR Chapter 7	Taking a precautionary approach, it is proposed that construction works will commence outside the bird nesting season (1st of March to 31st of August inclusive). Pre-commencement surveys will be undertaken prior to the initiation of works at the site. Any requirement for construction works to run into the subsequent breeding season following commencement will be subject to a repeat of the pre-commencement bird surveys to confirm the absence of breeding birds of conservation concern. The survey will aim to identify sensitive sites e.g. nests or roosts depending on the season in question.		
MM71	Design of the Proposed Project	EIAR Chapter 7	<ul style="list-style-type: none"> ➤ Hard standing areas have been designed to the minimum size necessary to accommodate the turbine model that is selected. ➤ Following best practice, the 0.8km of OHL will include line markers to increase their visibility to birds in flight. 		
Construction Phase					
MM72	Birds	EIAR Chapter 4, 6, 7, 9, 12 Appendix 4-4	<ul style="list-style-type: none"> ➤ A Construction and Environmental Management Plan (CEMP) has been prepared (see Appendix 4-4) and will be in place prior to the start of the construction phase. Best practice measures which form part of the design of the project are included in Chapter 4 of the EIAR. Note that these measures are proposed as industry best practice rather than to mitigate any identified significant effect and will be updated as required to address any conditions of a permission or findings of any pre-construction survey results. ➤ Works will commence outside the bird nesting season (1st of March to 31st of August inclusive). Any requirement for construction works to run into the subsequent breeding season following commencement will be informed by pre-construction bird surveys. Please see Appendix 7-7 for details. 		

			<ul style="list-style-type: none"> › Where sections of woody vegetation are removed for the purposes of the junction and road upgrades, these will be replaced with suitable hedge/tree species which are common in the local context. › During the construction phase, noise limits, noise control measures, hours of operation (i.e. dusk and dawn is high faunal activity time) and selection of plant items will be considered in relation to disturbance of birds. All plant and equipment for use will comply with the European Communities (Noise Emission By Equipment For Use Outdoors) Regulations, 2001, as amended (SI 632/2001). Plant machinery will also be turned off when not in use. › Silt fences will be installed as an additional water protection measure around existing watercourses. › If winter roosting or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located and no works shall be undertaken within a species-specific disturbance buffer in line with industry best practice (e.g. Goodship and Furness, 2022). No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied. › An Ecological Clerk of Works (ECoW) and Project Ecologist will be appointed. Duties will include: <ul style="list-style-type: none"> ○ Organise the undertaking of a pre-construction walkover bird survey to ensure that significant effects on birds will be avoided. ○ Inform and educate on-site personnel of the ornithological and ecological sensitivities within the Proposed Project site. ○ Oversee management of ornithological issues during the construction period and advise on ornithological issues as they arise. ○ Provide guidance to contractors to ensure legal compliance with respect to protected species onsite. ○ Liaise with officers of consenting authorities and other relevant bodies with regular updates in relation to construction progress as necessary. 		
Operational Phase					
MM73	Whooper Swan	EIAR Chapter 7	A 10ha enhancement area for Whooper Swan is proposed in the northwest of the Proposed Wind Farm, near Site Entrance 1 (see Section 4.7 of Chapter 4) in an area of bare cutover peat, located approx. 1.5km west of the nearest proposed turbine (T01) from proposed turbine		

		Appendix 6-5	infrastructure. The measures proposed includes the controlled flooding of an area of approximately 10ha to a depth of approximately 1.5m. This will be achieved by blocking drains and creation of berms as required to contain water. The controlled flooding will be such that water will be present during the winter months when whooper swan is present. Freshwater plants will be planted around the perimeter of the ephemeral wetland area. Visual screening from the internal road and car park will be created via planting of native scrub of c.3m width in the intervening area.		
MM74	Lapwing	<p>EIAR Chapter 7</p> <p>Appendix 6-5</p>	A 10ha enhancement area for breeding Lapwing is proposed in the northwest of the Proposed Wind Farm, near Site Entrance 1 (see Section 4.7 of Chapter 4) in an area of bare cutover peat, significantly removed from turbine infrastructure. This proposed 10ha area will be managed by annual mowing to keep the land open for breeding waders and free of predator posts (e.g. through birch scrub encroachment). Drains would be re-profiled and in-filled to allow unfledged chicks to move between dry and damp areas within the enhancement area. Wader scrapes will be excavated to a maximum depth of 30-45cm, with gentle sloping edges to provide foraging areas for breeding waders and their chicks. Visual screening from the internal road and car park will be provided via planting of native scrub in the intervening area, although sufficiently removed so as not to provide effective predator perches. Predator-proof fencing will be installed around the perimeter of the 10ha enhancement area.		
MM75	Barn Owl	<p>EIAR Chapter 7</p> <p>Appendix 6-5</p>	<p>It is proposed to install ten barn owl nest boxes. The design for the nest boxes will follow the recently published, ‘<i>Guidance Document for the Barn Owl Nest Box Action</i>’. Full details are provided in that document¹. It is proposed to site five no. nest boxes (suitable location to be chosen by ECoW and/or Project Ecologist) within the site. This area should be near to the 2021 nest site (Please see Confidential Appendix 7-5 for details) which makes these more likely to be encountered by barn owl and sufficiently distant from the Proposed Project site to avoid impacts. The location of the nest boxes will be registered with BirdWatch Ireland, through their request for barn owl nests information portal:</p> <p>https://survey123.arcgis.com/share/f0cac6f49de44d9c9fd60ca1195b4096.</p>		

¹ Lusby and McCarthy, BirdWatch Ireland (2022) *Guidance Document for the Barn Owl Nest Box Action*.

			<p>Implementation and Installation</p> <p>As per the RSPB recommendations², the following are prerequisites for the programme of barn owl nest box installation:</p> <ul style="list-style-type: none"> › The nest boxes will be built of an exterior grade plywood or other robust timber. Preservative can extend the life of the box but will only be applied to the outside of the box. Only use selected water-based preservatives, which are known to be safe for animals, such as Sadolin. Copper Chrome Arsenate (CCA) pressure-treated timber will not be used. › The nest boxes must be in place the winter before the first breeding season of the construction phase. › The nest box should be located with clear flight paths on a pole specifically erected for the purpose away from woodland edges to avoid predation of nests by pine martens, with the entrance facing away from the prevailing wind direction. › The nest boxes should be securely attached and sited a minimum of 5m above ground level. › Angle the box so that the floor slopes slightly away from the entrance. To ensure that the eggs remain in the sheltered end of the box should they roll. › The floor panel of the nest box should be replaced if it shows signs of rotting. › Annual monitoring will be scheduled to record information on occupancy, to inform the installation of additional nest boxes and to clean out a build-up of debris as required. 		
Decommissioning Phase					
MM76	Decommissioning	EIAR Chapter 7	<ul style="list-style-type: none"> › Taking a precautionary approach, it is proposed that decommissioning works will commence outside the bird nesting season (1st of March to 31st of August inclusive). Decommissioning monitoring surveys will be undertaken prior to works associated with decommissioning at the Proposed Wind Farm. 		

² <https://www.rspb.org.uk/birds-and-wildlife/advice/how-you-can-help-birds/nestboxes/nestboxes-for-owls-and-kestrels/providing-nest-sites-for-bigger-birds/>

		<p>Appendix 4-8</p>	<ul style="list-style-type: none"> ➤ The surveys will include a thorough walkover survey to a 500m radius of the development footprint and all works areas, where access allows. Any requirement for decommissioning works to run into the subsequent breeding season following commencement will be subject to a repeat of the decommissioning bird surveys to confirm the absence of breeding birds of conservation concern ➤ If winter roosting or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located and earmarked for monitoring at the beginning of the first winter or breeding season of the decommissioning phase. If it is found to be active during the decommissioning phase survey, no works shall be undertaken within a species-specific buffer (as per Goodship, N.M. and Furness, R.W. 2022), in line with industry best practice. No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied. <p>Regarding Ornithology and Avian Populations, the Decommissioning Plan will include industry best practice measures to mitigation the impact of works on birds, which may include the following:</p> <ul style="list-style-type: none"> ➤ No removal of woody vegetation or scrub will be carried out within the bird breeding season (March 1st to August 31st) ➤ Vantage Point surveys will be carried out for the season before and during the decommissioning process. ➤ The areas within 50m of the hard-stand and turbine foundations will be subject to a pre-works ornithology walkover to highlight any constraints that may be present (e.g. breeding or resting places of protected species). If any significant constraints are identified, appropriate controls will be developed and integrated into the live decommissioning plan ahead of the commencement of the work. ➤ Speed limits will be enforced on internal roads. 		
<p>EIAR Chapter 8 Land, Soils and Geology</p>					
<p>Construction Phase</p>					

MM77	Peat and Subsoil Excavation	EIAR Chapter 4, 8	<ul style="list-style-type: none"> ➤ Placement of turbines and associated infrastructure in areas with shallower peat where constraints allow; ➤ Use of floating roads, where appropriate, to reduce peat excavation volumes; ➤ The peat and subsoil which will be removed during the construction phase will be localised to the wind farm infrastructure: turbine locations, substation, temporary construction compounds and access roads; ➤ The Proposed Project has been designed to avoid sensitive habitats within the site; ➤ A minimal volume of peat and subsoil will be removed to allow for infrastructural work to take place in comparison to the total volume present on the site due to optimisation of the layout by mitigation by design; ➤ Excavated peat will only be moved short distances from the point of excavation and will be used locally for landscaping; ➤ Excavated peat that is not used locally for landscaping will be stored in the 4 no. borrow pits or in the 2 no. designated peat deposition areas; and, ➤ Construction of settlement ponds will be volume neutral, and all excess material will be used locally to form pond bunds and surrounding landscaping. 		
MM78	Leakages and Spillages	EIAR Chapter 4, 8 Appendix 4-4 Appendix 4-5	<ul style="list-style-type: none"> ➤ Minimal refuelling or maintenance of construction vehicles or plant will take place on site. Where possible, offsite refuelling will occur at a controlled fuelling station; ➤ Onsite re-fuelling will be undertaken using a double skinned bowser or a refuelling truck with spill kits kept onboard; ➤ Only designated trained operatives will be authorised to refuel plant on site; ➤ Taps, nozzles or valves associated with refuelling equipment will be fitted with a lock system; ➤ All fuel storage areas will be bunded appropriately for the duration of the construction phase. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area; ➤ Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage; ➤ The proposed onsite 220kV substation will be bunded appropriately to the volume of oils likely to be stored and to prevent leakage of any associated chemicals to groundwater or 		

			<p>surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor;</p> <ul style="list-style-type: none"> ➤ The plant used during construction will be regularly inspected for leaks and fitness for purpose; and, ➤ An emergency response plan for the construction phase to deal with accidental spillages is contained within the CEMP (which is contained in Appendix 4-4). 		
MM79	Erosion of Exposed Subsoils and Peat	Chapter 8 Appendix 4-3	<ul style="list-style-type: none"> ➤ All works will be completed in accordance with the Peat and Spoil Management Plan (see Appendix 4-3). ➤ All excavated peat and spoil shall be transported immediately on excavation to designated peat storage areas along the access roads and will be used on site for landscaping close to the extraction area; ➤ Where peat/spoil is not used to landscaping it will be transported immediately to one of the 2 no. proposed borrow pits or PDAs; ➤ Peat and spoil will not be transported significant distances upon excavation; ➤ Upon excavation, the upper vegetative layer (where still present) will be stored with the vegetation part of the sod facing the right way up to keep the plants and vegetation alive to aid construction reinstatement of disturbed ground; and, ➤ Re-seeding and spreading/planting will also be carried out in areas where ground will be disturbed. 		
MM80	Excavation of Proposed Borrow Pits		<ul style="list-style-type: none"> ➤ The rock within the proposed borrow pit footprints will be removed by breaking based on an assessment of its excavatability, which has been determined from a ground investigation carried out at the proposed borrow pits. ➤ It is proposed to construct the 4 no. borrow pits so that the base of the borrow pits are below the level of the adjacent section of internal road. As excavation progresses into the back edge of the borrow pits, localised deepening of the borrow pit floors may be required depending on extraction operations. ➤ It may be possible to excavate the rock from the borrow pits whilst leaving in place upstands/segments of intact rock which will retain the placed peat and spoil in individual cells. The upstands/segments of intact rock will essentially act as engineered rock buttresses within the borrow pits, forming a series of cells (up to 4 no. in each). The cells will be opened in sequence and filled as needed. 		

			<ul style="list-style-type: none"> › Slopes within the excavated rock formed around the perimeter of the borrow pits will be formed at stable inclinations to suit local in-situ rock conditions. Exposed sections of the rock slopes will be left with irregular faces and declivities to promote re-vegetation and provide a naturalistic appearance. › Where it is not possible to leave upstands/segments of intact rock in place it will be necessary to construct rock buttresses founded on in-situ rock within the borrow pits to create individual cells. The rock buttresses will be constructed of rock fill from the borrow pit excavation, placed and compacted in layers. The founding stratum for each rock buttress will be inspected and approved by The Project Geotechnical Engineer. › The rock buttresses will be constructed in stages to allow infilling of peat and spoil within cells. The buttress shall be constructed of selected rock fill and placed and compacted in suitable layers to form a buttress of sufficient stability to retain the placed peat and spoil. › Infilling of the peat and spoil will commence at the back edge of the borrow pit and progress towards the borrow pit entrance/rock buttress, leaving in place upstands/segments of intact rock which will help to retain the placed peat spoil and will allow the borrow pit to be developed and infilled in cells. The contractor excavating the rock will be required to develop the borrow pits in a way which will allow the excavated peat and spoil to be reinstated safely. › A number of rock buttresses to form cells within the borrow pits will be required to ensure access for trucks and excavators can be achieved. › The rock buttresses shall be wide enough (up to 4m) to allow construction traffic access for tipping and grading during the placement of the excavated peat and spoil. The permanent side slopes of the rock buttress shall be constructed between 40 to 60 degrees. › A rock buttress will be required on the downslope side of the borrow pits to safely retain the infilled peat and spoil. The height of the berm constructed will be greater than the height of the reinstated peat and spoil to prevent any surface peat and spoil runoff. A berm up to 8m (max.) in height will be required. › The rock buttress will be founded on mineral soil or bedrock i.e. competent strata. The founding stratum for the rock buttress will be inspected and approved by the Project Geotechnical Engineer. › A level surface in the underlying mineral soil or Weathered Bedrock will be prepared before placing and compacting the rock fill used to construct the berms. 		
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			<ul style="list-style-type: none"> › The use of temporary access ramps and long reach excavators during the placement of the excavated peat and spoil is likely to be required. › The surface of the placed peat and spoil shall be shaped to allow efficient run-off of surface water from the placed arisings. › As the berms are slightly higher than the retained peat, drains will be provided at regular intervals through the berms, at the same level as the top of the peat surface, to prevent ponding of water around the edges of the repositories. These drains will be 150mm diameter flexible plastic drainage pipe or equivalent. › A layer of geogrid to strengthen the surface of the placed peat and spoil within the borrow pits may be required. › The acrotelm shall be placed with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the peat and spoil within the borrow pits. › Supervision by the Project Geotechnical Engineer is required for the development of the borrow pits. › All the above-mentioned general guidelines and requirements will be implemented by the Contractor during construction. 		
MM81	Peat Instability and Failure	<p>ELAR Chapter 8</p> <p>Appendix 8-1</p>	<p>The following general control measures incorporated into the construction phase of the Proposed Project will assist in the management of the risks for this site:</p> <ul style="list-style-type: none"> › Appointment of experienced and competent contractors; › The site should be supervised by experienced and qualified personnel; › Allocate sufficient time for the construction of the Proposed Project (be aware that decreasing the construction time has the potential to increase the risk of initiating a localised peat movement); › Prevent undercutting of slopes and unsupported excavations; › Maintain and manage a robust drainage system; › Prevent placement of loads/overburden on marginal ground; › Set up, maintain and report findings from monitoring systems (as outlined in the Peat Stability Risk Assessment (Appendix 8-1)); › Ensure construction method statements are developed and agreed before commencement of construction and are followed by the contractor; and, 		

			<ul style="list-style-type: none"> › Revise and amend the Construction Risk Register as construction progresses to ensure that risks are managed and controlled for the duration of construction. 		
MM82	Proposed Onsite 220kV Substation	EIAR Chapter 9	<ul style="list-style-type: none"> › Mitigation measures in respect of peat and subsoil excavation are detailed in Line Item MM77 above; › Mitigation measures to prevent soil / subsoil contamination (leaks / spills) are dealt with in in Line Item MM78 above; and, › Mitigation measures dealing with soil erosion are dealt with in Line Item MM79 above. <p>Other than surface level and minor excavation works, any driven piles will not produce significant volumes of spoil, these will displace soil/subsoil within the ground.</p>		
MM83	Proposed Amenity Track	EIAR Chapter 4	<ul style="list-style-type: none"> › Mitigation measures in respect of peat and subsoil excavation are detailed in Line Item MM77 above; › Mitigation measures to prevent soil / subsoil contamination (leaks / spills) are dealt with in in Line Item MM78 above; and, › Mitigation measures dealing with soil erosion are dealt with in Line Item MM79 above. <p>Other than surface level and minor excavation works, any driven piles will not produce significant volumes of spoil, these will displace soil/subsoil within the ground.</p>		
MM84	TDR Accommodation Areas	EIAR Chapter 15	<ul style="list-style-type: none"> › Mitigation measures in respect of peat and subsoil excavation are detailed in Line Item MM77 above; › Mitigation measures to prevent soil / subsoil contamination (leaks / spills) are dealt with in in Line Item MM78 above; and, › Mitigation measures dealing with soil erosion are dealt with in Line Item MM79 above. <p>Other than surface level and minor excavation works, any driven piles will not produce significant volumes of spoil, these will displace soil/subsoil within the ground.</p>		
MM85	Biodiversity Management	EIAR Chapter 6, 8	<ul style="list-style-type: none"> › Mitigation measures in respect of peat and subsoil excavation are detailed in Line Item MM75 above; 		

	Enhancement Plan (BMEP)	Appendix 6-5	<ul style="list-style-type: none"> › Mitigation measures to prevent soil / subsoil contamination (leaks / spills) are dealt with in Line Item MM76 above; and, › Mitigation measures dealing with soil erosion are dealt with in Line Item MM77 above. 		
MM86	Proposed Grid Connection	ELAR Chapter 8	<ul style="list-style-type: none"> › Mitigation measures in respect of peat and subsoil excavation are detailed in Line Item MM77 above; › Mitigation measures to prevent soil / subsoil contamination (leaks / spills) are dealt with in Line Item MM78 above; and, › Mitigation measures dealing with soil erosion are dealt with in Line Item MM79 above. <p>Other than surface level and minor excavation works, any driven piles will not produce significant volumes of spoil, these will displace soil/subsoil within the ground.</p>		
Operational Phase					
MM87	Site Road Maintenance	ELAR Chapter 8	<ul style="list-style-type: none"> › Use of aggregate from authorised quarries for use in road and hardstand maintenance. 		
MM88	Site Vehicle/Plant Use	ELAR Chapter 4, 8 Appendix 4-4 Appendix 4-5	<ul style="list-style-type: none"> › Vehicles used during the operational phase will be refuelled off site before entering the Proposed Project site; › It is not envisioned that fuels will be stored on-site during the operational phase; › Spill kits will be available in all site vehicles to deal with an accidental spillage and breakdowns; and, › An emergency plan for the operational phase to deal with accidental spillages and breakdowns will be contained in the Construction and Environmental Management Plan (CEMP) (see Appendix 4-4). 		
MM89	Use of Oil in Transformers	ELAR Chapter 4, 8	<ul style="list-style-type: none"> › The electrical control building (at the substation) will be bunded appropriately to the volume of oils likely to be stored and to prevent leakage of any associated chemicals to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor; 		

		Appendix 4-4	<ul style="list-style-type: none"> > All transformer areas at the turbines will be banded to 110% of the volume of oil used in each transformer; > An emergency plan for the operational phase to deal with accidental spillages will be contained in the CEMP (Appendix 4-4). 		
Decommissioning Phase					
MM90	Decommissioning Phase	EIAR Chapter 8	<p>The potential impacts associated with decommissioning of the Proposed Project will be similar to those associated with construction but of reduced magnitude.</p> <p>Mitigation measures applied during decommissioning activities will be similar to those applied during construction where relevant.</p> <p>Mitigation measures to avoid contamination by accidental fuel leakage and compaction of soil by on-site plant will be implemented as per the construction phase mitigation measures.</p>		
EIAR Chapter 9 Water					
Pre-Construction Phase					
MM91	Temporary Drainage Works	EIAR Chapter 4, 9 Appendix 4-4	<p>All new proposed culverts and proposed culvert upgrades at field drain crossings required for the Proposed Wind Farm will be suitably sized for the expected peak flows in the watercourse.</p> <ul style="list-style-type: none"> > Culverts will be required where site roads and proposed hardstands cross the main bog drainage networks. These will be installed with a minimum gradient to reduce the entrainment of suspended solids. All culverts will be inspected regularly and maintained where appropriate. Culverts will remain in-situ during the operational phase of the Proposed Project. 		
Construction Phase					

MM92	Earthworks Resulting in Suspended Solids Entrainment in Surface Waters	<p>EIAR Chapter 4, 9</p> <p>Appendix 4-3</p> <p>Appendix 4-4</p> <p>Appendix 4-5</p>	<p>Proposed Mitigation by Avoidance:</p> <p>The key mitigation measure during the construction phase is the avoidance of sensitive hydrological features where possible, by application of suitable buffer zones (i.e. 50m to main watercourses, and 10m to main drains). All key Proposed Project areas (i.e., Proposed Project elements which have deep excavations and a potential to affect the regional groundwater system below the peat basin) are located significantly away from the delineated 50m watercourse buffer zones with the exception of the upgrading of the existing watercourse crossing, new drain crossing and upgrades to existing site access tracks. Additional control measures, which are outlined further on in this section, will be undertaken at these locations.</p> <p>The large setback distance from sensitive hydrological features means that adequate room is maintained for the proposed drainage mitigation measures (discussed below) to be properly installed and operate effectively. The proposed buffer zone will:</p> <ul style="list-style-type: none"> > Avoid physical damage (river/stream banks and river/stream beds) to watercourses and associated release of sediment; > Avoid excavations within close proximity to surface watercourses; > Avoid the entry of suspended sediment from earthworks into watercourses; and, > Avoid the entry of suspended sediment from the construction phase drainage system into watercourses, achieved in part by ending drain discharge outside the buffer zone and allowing percolation across the vegetation of the buffer zone. <p>In addition, and as outlined above the Proposed Project drainage system will link into the existing bog drainage system, and discharge from the bog via existing large settlement ponds, which are some distance from the Proposed Project footprint. As such, there is significant distance for wind farm-related surface water to travel before it reaches the edge of the bogs and joins any receiving waters outside of the Lemanaghan Bog boundaries.</p>		
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			<p>Proposed Mitigation by Design:</p> <p>There is an extensive network of drains already existing at the Proposed Project site. The existing drainage infrastructure is operating in accordance with BnM’s IPC licence requirements, with environmental monitoring and silt control measures being implemented. The existing drainage system at the Proposed Project site will be maintained and expanded locally as required for use within the Proposed Project drainage system. The key elements are the upgrading and improvements to water treatment elements, such as in-line controls and treatment systems, including wind farm related silt traps and settlement ponds.</p> <p>The elements of interaction with existing drains will be as follows:</p> <ul style="list-style-type: none"> › Interceptor drains will convey clean runoff water around works areas to the existing downstream drainage system (field drains and main drains). Where required, interceptor drains will be installed in advance of any construction works commencing. This will ensure that clean water is kept clean by diverting surface water flow around excavations, construction areas and temporary storage areas. Where possible (depending on orientation), existing field drains can be used as interceptors drains; › Collector drains will be used to intercept and collect runoff from construction areas (from turbine base/hardstand areas, construction compounds, and the substation). During the construction phase temporary settlement ponds will be used to attenuate and treat runoff from the construction areas (from turbine base/hardstand areas, construction compounds, and the substation) and treated water will then discharge into existing field drains and main drains. Temporary settlement ponds will be removed at the end of the construction phase (end of high-risk period), and wind farm runoff will discharge into existing field drains and main drains; › During the construction phase, temporary silt traps (silt fences) will be used as an additional water protection measure around the existing bog drainage network, particularly where works are proposed within 50m of a natural watercourse. The silt fences will be placed in the existing drains downstream of construction works, and the associated construction area run-off water will be diverted into proposed interceptor drains, or culverted under/across the works area; 		
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		<ul style="list-style-type: none"> › During the construction phase, dewatering silt bags will also be used as required. They can be used downgradient of turbine bases, where temporary pumping is required. Discharge from dewatering silt bags will flow into settlement ponds and treated water from settlement ponds will outfall to existing field drains and main drains; › Within the proposed site layout there are section of proposed floating road between turbine infrastructure. In these sections, and depending on intermediate topography, a collector drain (dirty water system as described above) may be used during construction stage, or over-the-edge (OTE) drainage will occur. OTE drainage allows runoff from access tracks to flow into local field drains and be managed via the existing site drainage system. OTE drainage will only occur where topography allows, and it is only proposed in areas of low risk and remote from outfall locations (at least 150m from bog outfall locations. Silt traps and check dams will be installed in field drains downstream of OTE drainage areas, and these will provide attenuation and treatment of dirty water; and, › Culverts will be required where site roads and proposed hardstands cross the main bog drainage networks. These will be installed with a minimum gradient to reduce the entrainment of suspended solids. All culverts will be inspected regularly and maintained where appropriate. Culverts will remain in-situ during the operational phase of the Proposed Project. <p>Water Treatment Train</p> <p>If the discharge water from construction areas fails to be of a high quality, then a filtration treatment system (such as a ‘siltbuster’ or similar equivalent treatment train (sequence of water treatment processes)) will be used to filter and treat all surface discharge water collected in the dirty water drainage system. This will apply throughout the construction phase.</p> <p>Silt Fences:</p> <p>Silt fences will be emplaced within drains down-gradient of all construction areas. Silt fences are effective at removing heavy settleable solids. This will act to prevent entry to the existing drainage network of sand and gravel-sized sediment, released from excavation of mineral sub-soils of glacial and glacio-fluvial origin and entrained in surface water runoff. Regular inspection</p>		
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			<p>and maintenance of these structures during construction phase is critical to their functioning to stated purpose. They will remain in place throughout the entire construction phase.</p> <p>Silt Bags:</p> <p>Silt bags will be used where small to medium volumes of water need to be pumped from excavations (e.g. the proposed underpass locations). As water is pumped through the bag, most of the sediment is retained by the geotextile fabric allowing filtered water to pass through.</p> <p>Pre-emptive Site Drainage Management:</p> <p>The works programme for the construction stage of the development will also take account of weather forecasts and predicted rainfall in particular. Large excavations and movements of peat/subsoil or peat stripping will be suspended or scaled back if heavy rain is forecast. The extent to which works will be scaled back or suspended will relate directly to the amount of rainfall forecast.</p> <p>The following forecasting systems are available and will be used on a daily/weekly basis, as required, to allow site staff to direct proposed and planned construction activities:</p> <ul style="list-style-type: none"> › General Forecasts: Available on a national, regional and county level from the Met Éireann website (www.met.ie/forecasts). These provide general information on weather patterns including rainfall, wind speed and direction but do not provide any quantitative rainfall estimates; › MeteoAlarm: Alerts to the possible occurrence of severe weather for the next 2 days. Less useful than general forecasts as only available on a provincial scale; › 3-hour Rainfall Maps: Forecast quantitative rainfall amounts for the next 3 hours but does not account for possible heavy localised events; › Rainfall Radar Images: Images covering the entire country are freely available from the Met Éireann website (www.met.ie/latest/rainfall_radar.asp). The images are a composite of radar data from Shannon and Dublin airports and give a picture of current rainfall extent and intensity. Images show a quantitative measure of recent rainfall. A 3-hour record is given and is updated every 15 minutes. Radar images are not predictive; and, 		
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			<p>› Consultancy Service: Met Éireann provide a 24-hour telephone consultancy service. The forecaster will provide interpretation of weather data and give the best available forecast for the area of interest.</p> <p>Using the safe threshold rainfall values will allow planned works to be safely executed (from a water quality perspective) in the event of forecasting of an impending high rainfall intensity event.</p> <p>Earthworks should be suspended if forecasting suggests any of the following is likely to occur:</p> <ul style="list-style-type: none"> › >10 mm/hr (i.e. high intensity local rainfall events); › >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or, › >half monthly average rainfall in any 7 days. <p>Prior to earthworks being suspended the following control measures should be completed:</p> <ul style="list-style-type: none"> › Secure all open peat/spoil excavations; › Provide temporary or emergency drainage to prevent back-up of surface runoff; and, › Avoid working during heavy rainfall and for up to 24 hours after heavy events to ensure drainage systems are not overloaded. <p>Management of Runoff from Peat and Subsoil Storage Areas:</p> <p>It is proposed that excavated peat and spoil will be used for landscaping close to its original extraction point. Peat will also be stored in the designated peat deposition areas, whilst excess peat and spoil will be placed in the proposed onsite borrow pits. During the initial placement of peat and spoil, silt fences, straw bales and biodegradable geogrids will be used to control surface water runoff from the storage areas as required. Interceptor and collector drains will be used at storage areas. ‘Siltbuster’ treatment trains will be employed if previous treatment is not to a high quality.</p>		
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		<p>Timing of Site Construction Works:</p> <p>Construction of the site drainage system will only be carried out during periods of low rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses. Construction of the drainage system during this period will also ensure that attenuation features associated with the drainage system will be in place and operational for all subsequent construction works.</p> <p>Proposed Drainage and Water Quality Monitoring</p> <p>An inspection and maintenance plan for the onsite drainage system will be prepared in advance of commencement of any works and will be included in the CEMP (see Appendix 4-4). Regular inspections of all installed drainage systems will be undertaken, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water in parts of the systems where it is not intended.</p> <p>Any excess build-up of silt levels at dams, the settlement ponds, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed.</p> <p>During the construction phase field testing (visual, supplemented with pH, electrical conductivity, temperature, dissolved oxygen and turbidity monitoring), sampling and laboratory analysis of a range of parameters³ with relevant regulatory limits and EQSs will be undertaken for each primary watercourse, and specifically following heavy rainfall events (i.e. weekly, monthly and event-based). The data will be processed and analysed and works will cease if elevated turbidity concentrations are recorded. In this event, all upstream silt traps and drainage routes will be inspected to identify the cause of the elevated turbidity levels. Works will not recommence until any issues have been resolved and the turbidity concentrations have returned to background concentrations.</p>		
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³ example suite: pH (field measured), Electrical Conductivity (field measured), temperature (field measured), Dissolved Oxygen (field measured), Turbidity (NTU) (sonde measured), Flow (m/s), Total Suspended Solids (mg/l), Ammonia, Nitrite (NO₂) (mg/l), Ortho-Phosphate (P) (mg/l), Nitrate (NO₃) (mg/l), Phosphorus (unfiltered) (mg/l), Chloride (mg/l), and BOD (mg/l).

			Where (temporary) deep excavations are proposed, cut-off drains or existing field drains will be used to reduce the amount of surface water entering the excavation. This will be the case around turbine base excavations.		
MM93	Groundwater Levels during Excavation Works	EIAR Chapter 9	<ul style="list-style-type: none"> > A key mitigation is the design of the proposed borrow pits. The scheduled depths of the proposed borrow pits are relatively shallow (7.0mbgl) which will limit the requirement for dewatering and significant effects on groundwater levels; > There are large separation distances between proposed borrow pits and sensitive receptors, and any potential associated groundwater wells. All sensitive receptors are remote from the proposed borrow pit locations and in excess of 1km from the proposed borrow pit locations; > There are large separation distances between the proposed turbine locations and sensitive receptors s. All sensitive receptors are remote, and in excess of 880m, from the proposed turbine locations; > Similarly, main streams and rivers are at least 150-500m away from any turbine and mast bases, and at these distances potential effects will be imperceptible; > The proposed underground cable trench is designed to be shallow and will only be approximately 1.2m in depth. At this depth, it will only potentially interact with shallow perched water within the peat profile. No interaction with deeper regional groundwater will occur. Therefore, no effects on the local groundwater table or flows will occur from this element of the Proposed Project; > The construction of the Proposed Grid Connection (i.e., proposed onsite 220kV substation, 4 no. steel masts, 2 no. gantry structure, telecommunications tower, and temporary access road) and amenity carparks will be relatively shallow and will only have the potential to interact with the shallow perched water table within the peat bog. No interaction with the deeper regional groundwater regime will occur. Therefore, no impacts on the local groundwater table or flows will occur; and, > The potential effect of the proposed piling works on groundwater is assessed separately in Line Item MM97 below. 		

MM94	Leakages or Spillages of Hydrocarbons	Chapter 9	<ul style="list-style-type: none"> > All plant will be inspected and certified to ensure they are leak free and in good working order prior to use on site; > Onsite re-fuelling of machinery will be carried out using a mobile double-skinned fuel bowser. The fuel bowser, a double-axle, custom-built refuelling trailer or truck will be re-filled off site and will be towed/driven around the site to where machinery are located. The 4x4 jeep/fuel truck will also carry fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use and only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations; > Fuels stored on site will be minimised. Any storage areas will be bunded appropriately for the fuel storage volume during the construction phase; > The electrical control building will be bunded appropriately to the volume of oils likely to be stored and to prevent leakage of any associated chemicals and to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor; > The plant used will be regularly inspected for leaks and fitness for purpose; > An emergency plan for the construction phase to deal with accidental spillages will be contained within the Construction Environmental Management Plan (CEMP) (Appendix 4-4). Spill kits will be available to deal with accidental spillages. 		
MM95	Release of Cement-Based Products	EIAR Chapter 4, 9 Appendix 4-4	<ul style="list-style-type: none"> > No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place; > Where possible pre-cast elements for culverts and concrete works will be used; > No washing out of any plant used in concrete transport or concreting operations will be allowed onsite; > Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water is to be isolated in temporary lined wash-out pits located near proposed site compounds. These temporary lined wash-out pits will be removed from the site at the end of the construction phase; 		

			<ul style="list-style-type: none"> > Any washing out of concrete pumping plant will also be into the temporary lined wash-out pits; > Will use weather forecasting to plan dry days for pouring concrete; and, > Will ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event. 		
MM96	Wastewater Disposal	EIAR Chapter 9	<ul style="list-style-type: none"> > There are a total of 5 no. proposed temporary construction compounds associated with the Proposed Project; > During the construction phase, a self-contained port-a-loo with an integrated waste holding tank will be used at each of the site compounds, maintained by the providing contractor, and removed from site on completion of the construction works; > Water supply for the site office and other sanitation will be brought to site and removed after use from the site to be discharged at a suitable off-site treatment location; > No water or wastewater will be sourced on the site, nor discharged to the site; and, > There will be no discharge of wastewater to ground at the site, and therefore there is no potential to impact groundwater or surface water quality. 		
MM97	Piled Foundations	EIAR Chapter 9	<p>The proposed mitigation measures designed for the protection of downstream surface water quality and groundwater quality within the peat bog will be implemented at all construction work areas.</p> <ul style="list-style-type: none"> > Mitigation measures for sediment control are detailed in Line Item MM92 above. > Mitigation measures for the control of hydrocarbons during construction works are detailed in Line Item MM94 above. > Mitigation measures for the control of cement-based products during construction works are detailed in Line Item MM95 above. > Mitigation measures in relation to wastewater are detailed in Line Item MM96 above. <p>Proposed mitigation measures relative to piling works will comprise:</p> <ul style="list-style-type: none"> > Where driven piles are used, they will have a cross section without re-entrant angles; > Strict Quality Assurance/Quality Control (QA/QC) procedures for piling works will be followed; 		

			<ul style="list-style-type: none"> > Piles will be kept vertical during piling works; > Good workmanship will be employed during all piling works; and, > Where required use bentonite seal to prevent upward/downward movement of surface water/groundwater. 		
MM98	Hydrologically Connected Designated Sites	ELAR Chapter 9	<p>Mitigation measures in relation to the protection of downstream surface water quality detailed in the preceding sections as follows:</p> <ul style="list-style-type: none"> > Mitigation measures for sediment control are detailed in Line Item MM92 above. > Mitigation measures for the control of hydrocarbons during construction works are detailed in Line Item MM94 above. > Mitigation measures for the control of cement-based products during construction works are detailed in Line Item MM95 above. > Mitigation measures in relation to wastewater are detailed in Line Item MM96 above. <p>Implementation of these mitigation measures will ensure the protection of water quality in receiving waters.</p> <p>Furthermore, groundwater from below the Proposed Project site may also discharge as baseflow to the Boor and Brosna rivers or their tributaries, thus entering the downstream designated sites. Groundwater quality and quantity will not be affected by the Proposed Project. Mitigation measures with respect to groundwater quality are prescribed in the preceding sections as follows:</p> <ul style="list-style-type: none"> > Mitigation measures for the control of hydrocarbons during construction works are detailed in Line Item MM94 above. > Mitigation measures for the control of cement-based products during construction works are detailed in Line Item MM95 above. > Mitigation measures in relation to wastewater are detailed in Line Item MM96 above. > Mitigation measures in relation to piling works are detailed in Line Item MM97 above. 		
MM99	Groundwater Abstractions	ELAR Chapter 9	<ul style="list-style-type: none"> > Mitigation measures for the control of hydrocarbons during construction works are detailed in Line Item MM94 above. 		

	(Public and Private)		<ul style="list-style-type: none"> > Mitigation measures for the control of cement-based products during construction works are detailed in Line Item MM95 above. > Mitigation measures in relation to wastewater are detailed in Line Item MM96 above. > Mitigation measures in relation to piling works are detailed in Line Item MM97 above. 		
MM100	Surface Water Drinking Supplies	ELAR Chapter 9	<ul style="list-style-type: none"> > Mitigation measures for sediment control are detailed in Line Item MM92 above. > Mitigation measures for the control of hydrocarbons during construction works are detailed in Line Item MM94 above. > Mitigation measures for the control of cement-based products during construction works are detailed in Line Item MM95 above. > Mitigation measures in relation to wastewater are detailed in Line Item MM96 above. 		
MM101	WFD Status and Objectives	ELAR Chapter 9 Appendix 9-3	<ul style="list-style-type: none"> > Mitigation measures for sediment control are detailed in Line Item MM92 above. > Mitigation measures for the control of hydrocarbons during construction works are detailed in Line Item MM94 above. > Mitigation measures for the control of cement-based products during construction works are detailed in Line Item MM95 above. <p>Implementation of these mitigation measures will ensure the protection of water quality in receiving waters.</p> <p>Furthermore, the mitigation measures previously outlined for the protection of groundwater quality and groundwater quantity are detailed above:</p> <ul style="list-style-type: none"> > Mitigation measures for the control of hydrocarbons during construction works are detailed in Line Item MM94 above. > Mitigation measures for the control of cement-based products during construction works are detailed in Line Item MM95 above. > Mitigation measures in relation to wastewater are detailed in Line Item MM96 above. > Mitigation measures in relation to piling works are detailed in Line Item MM97 above. 		

MM102	Biodiversity Management and Enhancement Plan	EIAR Chapter 9	All works undertaken will be completed in accordance with 'best practice' procedures and the mitigation measures in relation to the protection of surface and groundwater quality are detailed in the preceding sections.		
MM103	Amenity Track	EIAR Chapter 9	Detailed mitigation measures for sediment control are outlined in Line Item MM90 above and detailed mitigation measures for control of hydrocarbons during construction works are outlined in Line Item MM92 above.		
MM104	TDR Accommodation Works	EIAR Chapter 9	<p>Mitigation by Avoidance:</p> <p>A constraint/buffer zone will be maintained for all upgrade works locations where possible. In addition, measures which are outlined below will be implemented to ensure that silt-laden or contaminated surface water runoff from the excavation work does not discharge directly to the watercourse.</p> <p>The purpose of the constraint zone is to:</p> <ul style="list-style-type: none"> ➤ Avoid physical damage to surface water channels; ➤ Provide a buffer against hydraulic loading by additional surface water runoff; ➤ Avoid the entry of suspended sediment and associated nutrients into surface waters from excavation and earthworks; ➤ Provide a buffer against direct pollution of surface waters by pollutants such as hydrocarbons; and, ➤ Provide a buffer against construction plant and materials entering any watercourse. <p>General Best Practice Pollution Prevention Measures will also include:</p> <ul style="list-style-type: none"> ➤ No stockpiling of construction materials will take place within the constraints zone. No refuelling of machinery or overnight parking of machinery is permitted in this area; ➤ No concrete truck chute cleaning is permitted in this area; 		

			<ul style="list-style-type: none"> > Works shall not take place at periods of high rainfall, and shall be scaled back or suspended if heavy rain is forecast; > Plant will travel slowly across bare ground at a maximum of 5km/hr. > Machinery deliveries shall be arranged using existing structures along the public road; > All machinery operations shall take place away from the stream and ditch banks, although no instream works are proposed or will occur; > Any excess construction material shall be immediately removed from the area and taken to a licensed waste facility or the on-site spoil management areas; > No stockpiling of materials will be permitted in the constraint zones; > Spill kits shall be available in each item of plant required; and, > Silt fencing will be erected on ground sloping towards watercourses at the stream crossings if required. <p>Mitigation Measures relating to the use and storage of fuels and chemicals in terms of groundwater protection:</p> <ul style="list-style-type: none"> > No maintenance of construction vehicles or plant will take place along the temporary junction works areas; > The plant used will be regularly inspected for leaks and fitness for purpose; and, > Spill kits will be available to deal with accidental spillage. 		
MM105	Vegetation Removal	EIAR Chapter 9	<ul style="list-style-type: none"> > The felling will be completed primarily by hand in order to limit disturbance; > If machinery is required, works will be undertaken using machinery which are most suitable for the ground conditions and which will minimise soil disturbance; > Where possible, trees will be felled away from drains to prevent the unnecessary deposition of peat or brash into the bog drains; > Where machinery is required, brash/bog mats will be used to protect the peat surface and reduce erosion; > Silt fences will be installed downgradient of the works to intercept potentially silt laden runoff; and, > Works will be completed during periods of low rainfall. 		
Operational Phase					

MM106	Progressive Replacement of Natural Surfaces with Lower Permeability Surfaces	EIAR Chapter 4, 9 Appendix 4-4	<p>Proposed Mitigation by Design:</p> <p>As the part of the Proposed Project drainage design, it is proposed that runoff from the proposed infrastructure will be collected locally in new proposed silt traps, settlement ponds and vegetated buffer areas prior to release into the existing drainage network. The new proposed drainage measures will then create significant additional attenuation to what is already present. The operational phase drainage system will be installed and constructed in conjunction with the existing bog drainage network and will include the following:</p> <ul style="list-style-type: none"> ➤ Interceptor drains will be installed up-gradient of all proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then be directed to areas where it can be re-distributed into downstream field drains; ➤ Collector drains will be used to gather runoff from access roads and turbine hardstanding areas of the site, likely to have entrained suspended sediment, and channel it to new local settlement ponds for sediment settling; ➤ On sections of access road transverse drains ('grips') will be constructed where appropriate in the surface layer of the road to divert any runoff off the road into swales/roadside drains; ➤ Check dams will be used along sections of access road drains to intercept silts at source. Check dams will be constructed from a 4/40mm non-friable crushed rock; ➤ Settlement ponds, emplaced downstream of access road sections and at proposed turbine locations, will buffer volumes of runoff discharging from the drainage system during periods of high rainfall, by retaining water until the storm hydrograph has receded, thus reducing the hydraulic loading to existing drains; ➤ Settlement ponds will be designed in consideration of the greenfield runoff rate, existing bog settlement ponds will also buffer discharges from Lemanaghan Bog; and, ➤ Finally, all surface water runoff from the Proposed Project will have to pass through the settlement ponds at the existing bog outfall locations. 		
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MM107	Suspended Solids Entrainment in Surface Waters	EIAR Chapter 9	<p>Mitigation measures for sediment control are the same as those outlined in Line Item MM90 above.</p> <p>Mitigation measures for control of hydrocarbons during maintenance works are similar to those outlined in Line Item MM92 above.</p>		
MM108	Release of Wastewater	EIAR Chapter 9	<p>It is proposed to install a sealed underground holding tank for effluent (wastewater) from the substation building. The tank shall be routinely emptied by a licensed contractor. A level sensor will be installed in the tank which shall be linked to the on-site SCADA system. If the level of the tank contents rise to a predetermined 'high' level a warning shall appear on the overall SCADA system for the site and automatic notification shall be sent to the facility manager. A formal service agreement will be entered into with a suitably permitted waste contractor, in relation to the servicing and de-sludging of the wastewater holding tank on site. There will be no discharge of wastewater to ground at the site, and therefore there is no potential to impact groundwater or surface water quality.</p>		
MM109	Hydrocarbons	EIAR Chapter 9	<ul style="list-style-type: none"> ➤ Onsite re-fuelling of normal operational vehicles will not be carried out during the operational phase of the development. These vehicles will be refuelled offsite; ➤ Fuels stored on site will be minimised and any hydrocarbons stored on-site will be bunded. The bund capacity will be sufficient to contain 110% of the storage tank's maximum capacity; ➤ The substation will be bunded appropriately to the volume of oils likely to be stored, and to prevent leakage of any associated chemicals and to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor; ➤ Oil in the turbine transformers will be fully bunded within the enclosed turbine and as such, there is no potential pathway to the water environment i.e. the pathway has been blocked; ➤ Any plant used during the operational phase will be regularly inspected for leaks and fitness for purpose; and, ➤ Spill kits will be available to deal with accidental spillages. 		

MM110	WFD Status and Objectives	EIAR Chapter 9 Appendix 9-3	<ul style="list-style-type: none"> › There is no direct discharge from the Proposed Project site to downstream receiving waters. Mitigation for the protection of surface water during the operational phase of the Proposed Project will ensure the qualitative status of the receiving surface water bodies will not be altered by the Proposed Project. › Similarly, there is no direct discharge to groundwaters associated with the Proposed Project. Mitigation for the protection of groundwater during the operational phase of the Proposed Project will ensure that the qualitative status of the receiving groundwater bodies will not be altered by the Proposed Project. 		
Decommissioning Phase					
MM111	Decommissioning Phase	EIAR Chapter 9	The potential impacts associated with decommissioning of the Proposed Project will be similar to those associated with construction but of a reduced magnitude, due to the reduced scale of the proposed decommissioning works in comparison to construction phase works. Mitigation proposed in Line Items MM90 to MM103 will be implemented as appropriate.		
EIAR Chapter 10 Air Quality					
Construction Phase					
MM112	Exhaust Emissions	EIAR Chapter 10 Appendix 4-4	<ul style="list-style-type: none"> › All machinery will be switched off when not in use. › Construction staff will be trained how to inspect and maintain construction vehicles and plant to ensure good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required. › The majority of aggregate materials for the construction of the Proposed Project will be obtained from the borrow pits on site. This will significantly reduce the number of delivery vehicles accessing the site, thereby reducing the amount of emissions associated with vehicle movements. › The expected waste volumes generated onsite are unlikely to be large enough to warrant source segregation at the site. Therefore, all wastes streams generated onsite will be deposited into a single waste skip which will be covered. This waste material will be 		

			<p>transferred to a licensed/permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The Materials Recovery Facility (MRF) will be local to the Proposed Project site to reduce the amount of exhaust emissions associated with vehicle movements. The nearest licensed waste facility is located approximately 19.4km southeast of the Proposed Project site.</p> <p>› A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-4). The CEMP includes measures to reduce exhaust emissions.</p>		
MM113	Dust Emissions	<p>EIAR Chapter 10</p> <p>Appendix 4-4</p>	<p>› A wheelwash facility will be installed on the Proposed Wind Farm at all proposed construction site entrance and will be used by vehicles before leaving the site.</p> <p>› Sporadic wetting of loose stone surface will be carried out during the construction phase to minimise movement of dust particles to the air. In periods of extended dry weather, dust suppression may be necessary along haul roads, site roads, grid route, road widening sections, substation, and construction compounds and around the borrow pit area to ensure dust does not cause a nuisance.</p> <ul style="list-style-type: none"> ○ If necessary, such as during periods of dry weather, de-silted water will be taken from settlement ponds in the site’s drainage system and will be pumped into a bowser or water spreader to dampen down haul roads, turbine bases, borrow pit and site compounds to prevent the generation of dust where required. ○ Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff as outlined in the CEMP (see Appendix 4-4). <p>› Areas of excavation will be kept to a minimum and stockpiling of excavated material will be minimised by coordinating excavation, placement of material in peat placement areas and restoration of borrow pits.</p> <p>› Turbines components, construction materials and grid connection infrastructure will be transported to the site on specified haul routes only, as agreed with the local authority.</p> <ul style="list-style-type: none"> ○ The agreed haul route roads adjacent to the site will be regularly inspected for cleanliness and cleaned as deemed necessary by the construction Site Supervisor/Site Manager. 		

			<ul style="list-style-type: none"> > The transport of construction materials may have the potential to generate dust in dry weather conditions. Roads will be watered down to suppress dust particles in the air as deemed necessary by the Site Supervisor/Manager. > The transport of dry excavated material from the on-site borrow pits, which may have potential to generate dust will be minimised. If necessary, such as in periods of dry weather, excavated material will be dampened prior to transport from the borrow pits. > Waste material will be transferred to a licensed/permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. <ul style="list-style-type: none"> ○ The MRF facility will be local to the site to reduce dust emissions associated with vehicle movements. The nearest licensed waste facility is located approximately 19.4km southeast of the Proposed Project site. > A CEMP will be in place throughout the construction phase (see Appendix 4-4). The CEMP includes dust suppression measures. 		
Operational Phase					
MM114	Exhaust Emissions	EIAR Chapter 10	<ul style="list-style-type: none"> > Any vehicles or plant brought onsite during the operational phase will be maintained in good operational order that comply with the Road Traffic Acts 1961 as amended, thereby minimising any emissions that arise. > When stationary, delivery and on-site vehicles will be required to turn off engines. > Waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. <ul style="list-style-type: none"> ○ The MRF facility will be local to the site to reduce the emissions associated with vehicle movements. The nearest licensed waste facility is located approximately 19.4km southeast of the Proposed Project site. > Amenity carparks are spread out throughout the Proposed Wind Farm thus minimising the potential for traffic delays due to congestion building up at site entrance points and consequently further exhaust emissions. 		

MM115	Dust Emissions	EIAR Chapter 10	<ul style="list-style-type: none"> › Any vehicles or plant brought onsite during the operational phase will be maintained in good operational order that comply with the Road Traffic Acts 1961 as amended, thereby minimising any dust emissions that arise 		
Decommissioning Phase					
MM116	Decommissioning Phase	EIAR Chapter 10	<p>Any impact and consequential effect that occurs during the decommissioning phase will be similar to that which occur during the construction phase, albeit of lesser impact. The mitigation measures prescribed for the construction phase of the Proposed Wind Farm will be implemented during the decommissioning phase thereby minimising any potential impacts. The potential for effects during the decommissioning phase of the Proposed Wind Farm has been fully assessed in this EIAR.</p>		
EIAR Chapter 11 Climate					
Construction Phase					
MM117	Greenhouse Gas Emissions	EIAR Chapter 11	<ul style="list-style-type: none"> › Construction staff will be trained how to inspect and maintain construction vehicles and plant to ensure good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required. › All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise. › When stationary, delivery and on-site vehicles will be required to turn off engines. › Turbines and construction materials will be transported to the site on specified routes only unless otherwise agreed with the Planning Authority. Please see Section 15.1.6 of Chapter 15 for details. › It is intended to obtain the majority of materials for the construction of the Proposed Project from the proposed onsite borrow pits, with some material being imported from local licenced quarries as needed. This will significantly reduce the number of delivery vehicles accessing the site, thereby reducing the emissions associated with vehicle movements. 		

			<ul style="list-style-type: none"> > A CEMP (Appendix 4-4) will be in place throughout the construction phase. > The CEMP includes a Resource Waste Management Plant (RWMP) which outlines the best practice procedures that will occur during the construction phase relating to waste material. <ul style="list-style-type: none"> ○ The RWMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of construction of the Proposed Project. Disposal of waste will be seen as a last resort. ○ Section 4.5.7 of Chapter 4 for this EIAR refers to the methodology that will be utilised to manage onsite waste. This waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor. ○ The MRF facility will be local to the Proposed Project site to reduce the amount of emissions associated with vehicle movements. The closest MRF to the Proposed Project and is approximately 19.4km southeast of the Proposed Wind Farm. > Where applicable, low-carbon intensive construction materials will be sourced and utilised onsite. 		
Operational Phase					
MM118	Greenhouse Gas Emissions	EIAR Chapter 11	<ul style="list-style-type: none"> > Ensure that all maintenance and monitoring vehicles will be maintained in good operational order while onsite, and, when stationary, be required to turn off engines thereby minimising any emissions that arise. 		
Decommissioning Phase					
MM119	Decommissioning Phase	EIAR Chapter 11	Any impact and consequential effect that occurs during the decommissioning phase are similar to that which occur during the construction phase, albeit of lesser impact. The mitigation measures prescribed for the construction phase of the Proposed Project will be implemented during the decommissioning phase thereby minimising any potential impacts.		

EIAR Chapter 12 Noise					
Construction Phase					
MM120	Noise Control	EIAR Chapter 12 Appendix 4-4	<p>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.</p> <p>The following proposed measures to control noise will be implemented in full, include:</p> <ul style="list-style-type: none"> › Limiting the hours during which site activities likely to create high levels of noise or vibration are permitted; › Establishing channels of communication between the contractor/developer, Local Authority and residents; › Monitoring typical levels of noise and vibration during critical periods and at sensitive locations; › Selection of plant with low inherent potential for generation of noise and/ or vibration where practical; › Placing of noise generating / vibratory plant as far away from sensitive properties as practical within the site constraints, and; › The hours of construction activity will be limited to avoid unsociable hours where possible. Works operations shall generally be restricted to between 7:00hrs and 19:00hrs Monday to Friday and Saturday between 7:00hrs and 13:00hrs. However, to ensure that optimal use is made of good weather periods or at critical periods within the programme (e.g., concrete pours) or to accommodate delivery of large turbine components along public routes it could be necessary on occasion to work outside of these hours. Any such out of hours working will be agreed in advance with the Local Authority <p>And more specifically:</p> <ul style="list-style-type: none"> › The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations. 		

			<ul style="list-style-type: none"> › 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. <p>Where rock breaking is employed in relation to the Proposed Project, the following are examples of measures that will be employed, where necessary, to mitigate noise emissions from these activities:</p> <ul style="list-style-type: none"> › Fit suitably designed muffler or sound reduction equipment to the rock breaking tool to reduce noise without impairing machine efficiency; › Ensure all leaks in air lines are sealed; › Erect acoustic screen between compressor or generator and noise sensitive area; › When possible, line of sight between top of machine and reception point needs to be obscured; › Enclose breaker or rock drill in portable or fixed acoustic enclosure with suitable ventilation; › Air overpressure from a blast is difficult to control because of its variability, however, much can be done to reduce the effect. A reduction in the amount of primer cord used, together with the adequate burial of any that is above the ground, can give dramatic reduction to air overpressure intensities especially in the audible frequency range. Most complaints are likely to be received from an area downwind of the blast site, and therefore, if air blast complaints are a continual problem, it would be advisable to postpone blasting during unfavourable weather conditions if possible. As air blast intensity is a function of total charge weight, then a reduction in the total amount of explosives used can also reduce the air overpressure value; › Further guidance will be obtained from the recommendations contained within BS5228: Part 1 and the European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations 1988 in relation to blasting operations. 		
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Operational Phase					
MM121	Operational Phase (Noise)	EIAR Chapter 12 Appendix 12-6	<p>In the event of a complaint indicating potential excessive amplitude modulation or tonality associated with the Proposed Project, the Developer will fully investigate the complaint in collaboration with the turbine manufacturer, through review of the meteorological periods and conditions during which the reported AM or tonality occurs. A noise monitoring protocol would be established, in consultation with the relevant local authorities, which would set out the location and analysis methodology to be employed for the noise monitoring (Refer to Section 0 in Chapter 12). This can be secured via a planning condition.</p> <p>The measurement method outlined in the IOA AMWG document, known as the 'Reference Method', provide a robust and reliable indicator of AM and yield important objective information on the frequency and duration of occurrence, which can be used to evaluate different operational conditions including methods, determined in liaison with the turbine manufacturer, to minimise the occurrence of excessive AM. These mitigation measures, if required, will consist of either turbine blade modifications or the implementation of operational controls for the relevant turbine type, which will include operating turbines in different operational modes or turbine curtailment under specific operational conditions and may in very unlikely circumstance require turning specific turbines off under certain conditions.</p>		
Decommissioning Phase					
MM122	Decommissioning Phase (Noise)	Chapter 12 Appendix 4-8	<p>No specific mitigation measures are required for decommissioning. To ameliorate any potential noise impacts that may present during the decommissioning phase, a schedule of noise control measures has been formulated in accordance with best practice guidance. These are outlined in the Decommissioning Plan (Appendix 4-8) that has been prepared for the Proposed Project.</p>		

EIAR Chapter 13 Cultural Heritage					
Pre-Construction/ Construction Phase					
MM123	Recorded Monuments (Direct Effects)	EIAR Chapter 13	<ul style="list-style-type: none"> ➤ Preservation in situ of the extant gravel/stone trackway OF007-350—. The proposed road to T10 and T11 and the associated cabling where it crosses the trackway will be floated in order to avoid direct effects to this recorded monument. A horizontal buffer of 0.5m of material (sand) will be made above a layer of geotextile placed directly over the trackway. The top of the clean sand layer will be dead rolled, without vibration. Base geogrid will be laid on top of the sand layer along the line of the road above which the floating road will be constructed. The road will comprise a depth of up to 1,000mm of selected granular fill amounting to up to 1.5m between the top of the trackway and the floating road surface. ➤ Archaeological monitoring of ground works associated with the proposed new roads where such works interact with the recorded monuments discussed above will be undertaken. The monitoring will be carried out by a suitably qualified Archaeologist under licence from the National Monuments Service (NMS). A report on the monitoring will be compiled on completion of the work and submitted to the NMS and the Planning Authority/Body. Should archaeological finds, features or deposits be uncovered during the monitoring further mitigation such as preservation in situ or preservation by record (excavation) may be required and will be carried out in consultation with the NMS. 		
MM124	Sub-Surface Archaeological Potential	EIAR Chapter 13	<ul style="list-style-type: none"> ➤ Pre-development testing, under licence from the NMS, will be carried out in areas where peat depths allow a meaningful investigation. Testing will only be undertaken in areas where ground disturbance will take place as part of the Proposed Project. Where peat depths become a limitation to testing, monitoring at the construction stage will be undertaken. The areas to be tested will be chosen by the appointed Archaeologist and the number of test trenches agreed between the Archaeologist and the NMS through the licensing system. Peat depth data and local ground conditions may dictate the number and location of test trenches to be excavated. A report on the testing will be compiled on completion of the work. Should archaeological finds, structures or deposits be uncovered as a result of the testing further mitigation measures such as preservation in situ or preservation by record (excavation) may be required and will be decided in consultation 		

			<p>with the NMS. Such mitigation measures will be implemented, where relevant, following consultation with the NMS.</p> <ul style="list-style-type: none"> ➤ 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. 		
EIAR Chapter 14 Landscape and Visual					
Construction Phase					
MM125	Visual Effects	EIAR Chapter 14 Appendix 14-6	<ul style="list-style-type: none"> ➤ In all circumstances, excavation depths and volumes will be minimised, and excavated material will be re-used where possible. ➤ Any areas of bare soil remaining after the landscaping phase will be reseeded and left to revegetate naturally 		
Operational Phase					
MM126	Landscape Effects	EIAR Chapter 14	<ul style="list-style-type: none"> ➤ The spatial configuration of the proposed infrastructure footprint has been carefully designed to minimise the loss of valuable landscape receptors on the Proposed Project site, such as remnants of uncut raised bog, mature woodland or features of cultural heritage value. ➤ The internal site road layout makes use of the existing roads wherever possible, to minimise the requirement for new tracks within the site. ➤ To minimise cut and fill activities required to construct the Proposed Project, the proposed access roads, and other infrastructure such as hardstands have been designed to align with the existing terrain within the landscape of the site 		

			<ul style="list-style-type: none"> › In all circumstances, excavation depths and volumes will be minimised, and excavated material will be re-used where possible. › Dedicated public walking trails are included in the Amenity Plan as part of the Proposed Wind Farm and will add recreational value to the landscape of the Proposed Wind Farm. › A dedicated Landscape Plan including proposed berms and planting areas are included to mitigate landscape and visual effects of the proposed onsite 220kV substation. This is presented and discussed in more detail in Appendix 14-6. 		
MM127	Visual Effects	<p>EIAR Chapter 14</p> <p>Appendix 14-5</p> <p>Appendix 14-6</p>	<p>Proposed Onsite 220kV Substation</p> <p>The following measures will be implemented to mitigate effects during and upon completion of the construction phase of the Proposed Substation (See Landscape Plan – Appendix 14-6):</p> <ul style="list-style-type: none"> › Construction of 2m x 8m berms along the eastern perimeter of the substation at the start of the construction phase. › Toward the end of construction, berms will be built around the northern extent of the proposed onsite 220kV substation underneath the overhead line and on top of the hardstand area. › Following completion of the infrastructure, planting is proposed along the eastern boundary of the proposed onsite 220kV substation, both on the berm and adjacent to the access roads, which will serve as landscape and visual mitigation during the operational phase. › Planting is proposed further north of the proposed onsite 220kV substation, and within the inner perimeter of the road to provide ecological connectivity with existing vegetation at the site boundary and also provide landscape and visual mitigation from residential receptors throughout the operational phase. <p>Mitigation By Design</p> <ul style="list-style-type: none"> › The Proposed Wind Farm layout has been designed to create a coherent arrangement of turbines, contiguous and connected to each other visually and with consistent spacing in line with the guidance for the design and siting of wind farms with the ‘Flat Peatland’ 		

			<p>landscape type defined in the DoEHLG 2006 Guidelines and regard to the Draft DoHPLG 2019 Guidelines.</p> <ul style="list-style-type: none"> ➤ The proposed turbines have an even height profile, which makes them appear as a visually coherent cluster in most of the photomontages presented in the <i>Volume 2: Photomontage Booklet</i> and the photowires in Appendix 14-5. This is clearly the case when seen from elevated vantage points within the wider landscape, such as Knockastia Hill in Co. Westmeath as seen in Photomontage Viewpoint (VP) 18, the turbines occupy an even horizontal height profile. ➤ A comprehensive Landscape Plan has been developed to minimise visual impacts of the proposed onsite 220kV substation on nearby residential receptors. This plan, discussed in Section 14.7.3.2.5 in Chapter 14 and shown in Appendix 14-6 includes strategic planting of vegetation and the construction of berms to limit the visibility of the proposed onsite 220kV substation from nearby residences. ➤ The layout of the Proposed Project has been designed to ensure minimal loss of valuable landscape receptors such as areas of intact bog, woodland or valuable biodiversity corridors. ➤ The Proposed Grid Connection connects to an existing network and existing Shannonbridge-Maynooth 220kV overhead line (OHL) located approximately 0.4km north of the proposed onsite 220kV substation, therefore eliminating the need for substantial development to facilitate the connection to the national grid in the wider landscape, consequently eliminating landscape and visual impacts beyond the vicinity of the Proposed Project site. ➤ The Proposed Wind Farm is set-back beyond the buffer specifically created to mitigate impacts on the Lemanaghan Monastic Site as set out in local planning policy through the 2021 amended Wind Energy Zoning (as per the Chief Executive’s Report), with the exception of turbine T05, which is located on the boundary of an area designated ‘not Deemed Suitable for Wind Energy Developments’. 		
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EIAR Chapter 15 Material Assets					
Material Assets - Traffic					
Construction Phase					
MM128	Delivery of Abnormal Loads	Chapter 15	<p>The following are the main points to note for these deliveries which will take place after peak evening traffic:</p> <ul style="list-style-type: none"> › The delivery of turbine components is a specialist transport operation with the transportation of components carried out at night when traffic is at its lightest and the impact minimised. › The deliveries will be made in consultation with the Local Authority and An Garda Síochána. › It is estimated that 120 abnormal sized loads will be delivered to the site, comprising 40 convoys of 3 vehicles, undertaken over 40 separate nights. › These nights will be spread out over an approximate period of 8 weeks and will be agreed in advance with the relevant authorities, › In order to manage each of the travelling convoys, for each there will be two Garda escort vehicles that will stop traffic when required at the front and rear of the convoy of 3 vehicles. › There will also be two escort vehicles provided by the haulage company for each convoy. › Deliveries of abnormal loads will be delivered to the Proposed Project site during nighttime 		
MM129	General Traffic Management	EIAR Chapter 15 Appendix 15-2	<p>A detailed Traffic Management Plan (TMP) (Appendix 15-2) will be provided specifying details relating to traffic management and included in the CEMP (Appendix 4-4) prior to the commencement of the construction phase of the Proposed Project. The TMP will be agreed with the local authority and An Garda Síochána prior to construction works commencing onsite. The detailed TMP will include the following:</p>		

		<ul style="list-style-type: none"> › Traffic Management Coordinator – a competent Traffic Management Co-ordinator will be appointed for the duration of the development, and this person will be the main point of contact for all matters relating to traffic management. › Delivery Programme – a programme of deliveries will be submitted to Offaly County Council in advance of deliveries of turbine components to the Proposed Wind Farm. Liaison with the relevant local authorities, Transport Infrastructure Ireland (TII) and Motorway Maintenance and Renewal Contractors (MMaRC) will be carried out where required regarding requirements such as delivery timetabling. The programme will ensure that deliveries are scheduled in order to minimise the demand on the local network and minimise the pressure on the access to the Proposed Wind Farm. › Information to locals – Locals in the area will be informed of any upcoming traffic related matters e.g. the delivery of turbine components at night via letter drops and posters in public places. Information will include the contact details of the Project Co-ordinator, who will be the main point of contact for all queries from the public or local authority during normal working hours. An out-of-hours emergency number will also be provided. › A Pre and Post Construction Condition Survey – Where required by the local authority, a pre-condition survey of roads associated with the Proposed Project will be carried out immediately prior to construction commencement to record an accurate condition of the road at the time. A post construction survey will be carried out after works are completed to ensure that any remediation works are carried out to a satisfactory standard. Where required the timing of these surveys will be agreed with the local authority. All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers. › Liaison with the relevant local authority - Liaison with Offaly County Council and An Garda Síochána, will be carried out during the delivery phase of the large turbine vehicles, when an escort for all convoys will be required. Once the surveys have been carried out and “prior to commencement” status of the relevant roads established, (in compliance with the provisions of the CEMP (see Appendix 4-4), the Roads Section of Offaly County Council will be informed of the relevant names and contact numbers for the Project Developer/Contractor Site Manager as well as the Site Environmental Manager. › Implementation of temporary alterations to road network at critical junctions – at locations highlighted in Section 15.1.9 of Chapter 15 of the EIAR. 		
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			<ul style="list-style-type: none"> › Identification of delivery routes – These routes will be agreed with Offaly County Council and adhered to by all contractors. › Delivery times of large turbine components - The TMP will include the option to deliver the large wind turbine plant components at night in order to minimise disruption to general traffic during the construction stage. › Travel plan for construction workers – While the assessment above has assumed the worst case in that construction workers will drive to the site, the construction company will be required to provide a travel plan for construction staff, which will include the identification of routes to/from the site and identification of an area for parking. › Additional measures - Various additional measures will be put in place in order to minimise the effects of the development traffic on the surrounding road network including wheel washing facilities on site and sweeping/cleaning of local roads as required. These are set out in the CEMP which is contained in Appendix 4-4. › Re-instatement works - All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers. 		
Decommissioning Phase					
MM130	Decommissioning Phase	<p>EIAR Chapter 15</p> <p>Appendix 4-8</p>	<p>In the event that the Proposed Project is decommissioned after the 35 years of operation, a decommissioning plan, will be prepared for agreement with the local authority, as described in Chapter 4 and Appendix 4-8 Decommissioning Plan. This plan will include preparation of a material recycling / disposal and traffic management plan for agreement with the local authority prior to decommissioning, in accordance with Scottish Natural Heritage report (SNH) <i>Research and Guidance on Restoration and Decommissioning of Onshore Wind Farms</i> (SNH, 2013).</p>		
Material Assets - Other					
Pre-Construction/Construction Phase					

MM131	Electricity	<p>EIAR Chapter 4, 5, 15</p> <p>Appendix 4-4</p>	<ul style="list-style-type: none"> ➤ Prior to construction, the Applicant will engage with ESB via the ‘Dial Before You Dig’ procedure online. ESB will be contacted via dig@esb.ie before excavating near any overhead lines. ➤ The suitability of machinery and equipment for use near power lines will be risk assessed. ➤ All staff will be trained on operating voltages of overhead electricity lines running the site. All staff will be trained to be aware of the risks associated with overhead lines. All contractors that may visit the sites are made aware of the location of lines before they come on to site. ➤ Barriers will run parallel to the overhead line at a minimum horizontal distance of 6 m on plan from the nearest overhead line conductor wire. ➤ When activities must be carried out beneath overhead lines, e.g. component delivery or substation construction, a site-specific risk assessment will be undertaken prior to any works. The risk assessment must take into account the maximum potential height that can be reached by the plant or equipment that will be used prior to any works. Overhead line proximity detection equipment will be fitted to machinery when such works are required. ➤ Information on safe clearances will be provided to all staff and visitors. ➤ Signage indicating locations and health and safety measures regarding overhead lines will be erected in canteens and on site. ➤ All staff will be made aware of and adhere to the Health & Safety Authority’s ‘Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021’. This will encompass the use of all necessary Personal Protective Equipment and adherence to the site Health and Safety Plan. ➤ All health and safety measures as detailed in the Construction Environment Management Plan Appendix 4-4) and Chapter 5 of the EIAR will be adhered to during the construction, operation and decommissioning phases. 		
MM132	Water	<p>EIAR Chapter 9, 15</p>	<ul style="list-style-type: none"> ➤ Chapter 9 assesses the potential for impact on public water supply and private wells during the construction, operation and decommissioning phases. While no significant effects are identified, best practice mitigation measures have been prescribed to in the chapter to minimise impacts on groundwater during the construction stage from the potential release of hydrocarbons, wastewater and cement-based products. 		

MM133	Waste Management	EIAR Chapter 15 Appendix 4-4	<ul style="list-style-type: none"> ➤ All waste generated on site during the construction phase will be contained in waste skip at a waste storage area on site. This waste storage area will be kept tidy with skips clearly labelled to indicate the allowable material to be disposed of therein. The expected waste volumes generated on site are unlikely to be large enough to warrant source segregation at the Proposed Project site. Therefore, all waste streams generated on site will be deposited into a single waste skip. The waste material will be transferred to a Materials Recovery Facility (MRF) by a fully licenced waste contractor where the waste will be sorted into individual waste stream for recycling, recovery or disposal. ➤ Site personnel will be instructed at induction that under no circumstances can personal waste be brought on site for disposal in the onsite waste skip. It will also be made clear that the burning of waste material on site is forbidden. ➤ Further details on waste management are presented in the CEMP which is included as Appendix 4-4. 		
Operational Phase					
MM134	Water	EIAR Chapter 9,15	Chapter 9 assesses the potential for impact on public water supply and private wells during the construction, operation and decommissioning phases. The chapter includes mitigation measures to minimise impacts on groundwater during the construction stage from the potential release of hydrocarbons, wastewater and cement-based products. These measures are detailed in Line Items MM89 to MM109 above.		
MM135	Waste Management Services	EIAR Chapter 15	<ul style="list-style-type: none"> ➤ During the operational phase, the Proposed Project site will include appropriate signage encouraging amenity users to leave the area waste free and bring waste materials home for proper disposal. ➤ Any waste generated due to the operation and maintenance of the Proposed Project will be disposed of in a covered skip, located within the proposed onsite 220kV substation compound. The waste material will be transferred to a Materials Recovery Facility (MRF) by a fully licenced waste contractor where the waste will be sorted into individual waste stream for recycling, recovery or disposal. ➤ The wastewater holding tank will be emptied when required by a licenced contractor. 		

MM136	Telecommunications	EIAR Chapter 15	While no mitigation measures are required, a standard Protocol Document has been prepared by 2RN for the Proposed Project. It is standard practice of 2RN to produce a protocol document for wind farm developments, which will be signed by the developer prior to construction. The Protocol Document is further detailed in Section 15.2.4 of Chapter 15.		
MM137	Aviation	EIAR Chapter 15	<p>The following IAA and DoD requests will be complied with should the Proposed Project be consented.</p> <p>DOD requests:</p> <ol style="list-style-type: none"> 1. Turbines will be illuminated by high intensity obstacle lights that will allow the hazard to be identified and avoided by aircraft in flight (and in liaison with IAA requirement No.1 below). 2. Obstruction lights will be incandescent or of a type visible to Night Vision Equipment. 3. Obstruction lighting fitted to obstacles must emit light at the near Infra-Red (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. <p>IAA requests:</p> <ol style="list-style-type: none"> 1. To agree an aeronautical obstacle warning light scheme for the Proposed Project. 2. To provide as-constructed coordinates in WGS84 format together with above mean sea level tip height elevations at each wind turbine location 3. To notify the Authority of intention to commence crane operations with at least 30 days prior notification of their erection. 		
Decommissioning Phase					



MM138	Telecommunications	EIAR Chapter 15 Appendix 4-8	As stated in Section 15.2.6.2 in Chapter 15, the potential for electromagnetic interference from wind turbines occurs only during the operational phase of the Proposed Project. There are no electromagnetic interference impacts associated with the decommissioning phase of the Proposed Project, and therefore no mitigation is required.		
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18.2

EIAR Monitoring Measures

Table 18-2 Schedule of Monitoring Measures

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

		<p>commencement surveys will be undertaken within one month prior to the initiation of works. The purpose of these surveys is to identify sensitive roosting sites.</p> <p>If works run into the subsequent breeding season(s) (April-September), surveys will be conducted to identify sensitive nesting sites. Breeding season surveys will be conducted once per month from April to July inclusive when works are taking place. If works run into the subsequent winter season(s) (October to March), surveys will be repeated to identify sensitive roost sites. These surveys will be conducted at the beginning of each winter season (e.g., October) and continue if evidence of roosting of birds of conservation concern is observed.</p> <p>Surveys will be undertaken by a suitably qualified ornithologist. The survey will comprise a thorough walkover survey of the Proposed Project footprint and/or all works areas to a 500m radius, where access allows. If winter roosts or nests of birds of high conservation concern are identified, the roost/nest will be earmarked for continued monitoring during works. If the roost/nest is found to be active during works, works will cease within a species-specific buffer of its location in line with best practice guidance (Forestry Commission Scotland, 2006; Goodship and Furness 2022; Ruddock and Whitfield, 2007) to avoid disturbance. No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied. Aerial surveys using a drone may be used to confirm the presence or absence of roosting/nesting birds, where conditions are suitable.</p> <p>All site staff and subcontractors will be made aware of any restrictions to be imposed by means of a toolbox talk and a map of the 'no-work zone' will be made available to all construction staff. The restricted area will also be marked to alert all personnel on site to the suspension of works within that area.</p>			
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Construction Phase						
MX4	Health and Safety	ELAR Chapter 4, 5 Appendix 4-4	<p>The Project Supervisor Construction Stage (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):</p> <ul style="list-style-type: none"> > 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: <ul style="list-style-type: none"> ○ Induction of all site staff including any new staff enlisted for the project from time to time; ○ Toolbox talks as necessary; ○ Maintenance of a file which lists personnel on site, their name, nationality, current SafePass number, current Construction Skills Certification Scheme (CSCS) card (where relevant) and induction date; ○ Report on site activities to include but not limited to information on accidents and incidents, disciplinary action taken and Personal Protective Equipment (PPE) compliance; ○ Monitor the compliance of contractors and others and take corrective action where necessary; and ○ Notify the Planning Authority and the client of non-compliance with any written directions issued. 	Daily	Daily	PSCS

MX5	Reactive Site Drainage Management	EIAR Chapter 4, 9	<p>The effectiveness of drainage measures designed to minimise runoff entering works areas and capture and treat potentially silt-laden water from the works areas, will be monitored continuously by the EnvCoW on-site. The EnvCoW or project hydrologist will respond to changing weather, ground or drainage conditions on the ground as the project proceeds, to ensure the effectiveness of the drainage design is maintained.</p> <p>The EnvCoW or Project Hydrologist will respond to changing weather, ground or drainage conditions on the ground as the Proposed Project proceeds, to ensure the effectiveness of the drainage design is maintained in so far as is possible. This may require the installation of additional check dams, interceptor drains or swales as deemed necessary on-site. The drainage design may have to be modified on the ground as necessary, and the modifications will draw on the various features outlined above in whatever combinations are deemed to be most appropriate to situation on the ground as a particular time.</p>	As required	As Necessary	EnvCoW
MX6	Water Quality and Monitoring	EIAR Chapter 9	<p>Daily inspection and recording of surface water management system by on-site EnvCoW and immediate remedial measures to be carried out as required and works temporarily ceased if a retained stormwater/sediment load is identified to have the potential to migrate from the site. The following periodic inspection regime will be implemented:</p> <ul style="list-style-type: none"> › Daily general visual inspections of site operations and inspections of all drainage infrastructure within the site and in the surrounding area by the EnvCoW or a suitably qualified and competent person as delegated by the EnvCoW; › Inspections to include all elements of drainage infrastructure to ensure the system is operating correctly and to identify and 	Daily	As Necessary	EnvCoW / Project Hydrologist

			<p>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;</p> <ul style="list-style-type: none"> › Event based inspections by the EnvCoW as follows: <ul style="list-style-type: none"> ○ >10 mm/hr (i.e. high intensity localised rainfall event); ○ >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or, ○ Rainfall depth greater than monthly average in 7 days (prolonged heavy rainfall over a week). › Monthly site inspections by the Project Hydrologist/ EnvCoW during construction phase; › Quarterly site inspections by the Project Hydrologist/ EnvCoW after construction for a period of one year following the construction phase; and, › A written record will be maintained or available on-site within the CEMP (Appendix 4-4) which will be maintained on-site during the construction phase. › Daily inspection and recording of surface water management system by on-sit EnvCoW and immediate remedial measures to be carried out as required and works temporarily ceased if a retained stormwater/sediment load is identified to have the potential to migrate from the site. › Complete ongoing inspection and monitoring of the development, particularly in areas of drainage control in support of the EnvCoW in monitoring the effectiveness of the drainage design as it is implemented on-site. 			
MX7	Water Discharge	EIAR Chapter 4	<ul style="list-style-type: none"> › There will be no direct discharges to any natural watercourses, with all drainage waters being dispersed as overland flows. All 			

		Appendix 4-4	discharges from the proposed works areas will be made over vegetation filters at an appropriate distance from natural watercourses.			
		Appendix 4-5	<ul style="list-style-type: none"> > Dewatering silt bags are also used where water is pumped temporarily from excavations (e.g., turbine bases). Water is pumped into the silt bags, and then arising discharge is filtered through the silt bag fabric and flows into local collector drains. > Collect potentially silt-laden runoff from works areas via downgradient collector drains and manage via series of avoidance, source, in-line treatment and discharge to ground via infiltration drains and infiltration areas. 			
MX8	Surface Water Quality	EIAR Chapter 9	<ul style="list-style-type: none"> > During the construction phase field testing (visual, supplemented with pH, electrical conductivity, temperature, dissolved oxygen and turbidity monitoring), sampling and laboratory analysis of a range of parameters⁴ with relevant regulatory limits and Environmental Quality Standards (EQSs) will be undertaken for each primary watercourse, and specifically following heavy rainfall events (i.e. monthly and event-based). > The data will be processed and analysed and works will cease if elevated turbidity concentrations are recorded. In this event, all upstream silt traps and drainage routes will be inspected to identify the cause of the elevated turbidity levels. Works will not recommence until any issues have been resolved and the turbidity concentrations have returned to background concentrations. 	As Required	Monthly	EnvCoW

⁴ example suite: pH (field measured), Electrical Conductivity (field measured), temperature (field measured), Dissolved Oxygen (field measured), Turbidity (NTU) (sonde measured), Flow (m/s), Total Suspended Solids (mg/l), Ammonia, Nitrite (NO₂) (mg/l), Ortho-Phosphate (P) (mg/l), Nitrate (NO₃) (mg/l), Phosphorus (unfiltered) (mg/l), Chloride (mg/l), and BOD (mg/l).

MX9	Plant and Equipment Inspections	EIAR Chapter 9	The plant used will be regularly inspected for leaks and fitness for purpose.	As Required	Monthly	EnvCoW
MX10	Traffic and Transport	Appendix 4-4	The agreed haul route roads adjacent to the site will be regularly inspected for cleanliness and cleaned as deemed necessary by the construction Site Supervisor/Site Manager.	As required	Monthly	EnvCoW
MX11	Biodiversity	Appendix 4-4	<p>The Project Ecologist will be available to support the EnvCoW on matters relating to the protection of sensitive habitats and species encountered prior to or during the construction phase of the Proposed Project. The Project Ecologist will not be full time on site but will undertake pre-commencement surveys and visit the site as required. The responsibilities and duties of the Project Ecologist/Ornithologist will include the following:</p> <ul style="list-style-type: none"> › Undertake a pre-construction transect/walkover bird survey to ensure that significant effects on breeding birds will be avoided. › Inform and educate on-site personnel of the ornithological and ecological sensitivities within the site. › Oversee management of ornithological and ecological issues during the construction period and advise on ornithological and ecological issues as they arise. › Provide guidance to contractors to ensure legal compliance with respect to protected species onsite. › Liaise with officers of consenting authorities and other relevant bodies with regular updates in relation to construction progress. 	As required	As required	Project Ecologist
MX12	Birds	EIAR Chapter 7	A CEMP has been prepared (see Appendix 4-4) and will be in place prior to the start of the construction phase. Best practice measures which form part of the design of the project are included in Chapter 4 of the EIAR. Note that these measures are proposed as industry	As Required	As required	Project Ornithologist

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

Operational Phase						
MX15	Drainage Inspections	Appendix 4-4	The drainage system will be monitored in the operational phase until such a time that all areas that have been reinstated become re-vegetated and the natural drainage regime has been restored.	Monthly	Monthly	ECoW
MX16	Bats	EIAR Chapter 6 Appendix 6-1	<p>Bat Monitoring Plan</p> <ul style="list-style-type: none"> › To assess the effects of the Proposed Project on bat activity, 3 years of post-construction monitoring is proposed. Post-construction monitoring will include static detector surveys, walked survey transects and corpse searching to record any bat fatalities resulting from collision. › At the end of each year, the efficacy of the mitigation and monitoring plan will be reviewed, and any identified efficiencies incorporated into the programme. The post-construction surveys will be carried out as per the pre-construction survey effort. › Full spectrum recording detectors will be utilised for the same duration as during pre-application surveys and at the same density (NatureScot, 2021). Carcass searches, to monitor and record bat fatalities, shall be conducted at each turbine in accordance with NatureScot/NIEA Guidance. This shall include searcher efficiency trials and an assessment of scavenger removal rates to determine the appropriate correction factor to be applied in relation to determining an accurate estimate of collision mortality. › Monitoring surveys shall continue in Year 2 and 3, and where a curtailment requirement has been identified, the success of the curtailment strategy shall be assessed in line with the baseline data collected in the preceding year(s). 	Years 1, 2, 3	Annually	Project Ecologist

		<p>assessments will be carried out in Years 1, 3, 5, 7, 10, 15 and 20 of the BMEP (Appendix 6-5).</p> <ul style="list-style-type: none"> › Monitoring surveys will also include presence/absence surveys for marsh fritillary larvae. These will be carried out in accordance with best practice guidance (NRA, 2009) and the NBDC Marsh Fritillary survey methodologies for larval web surveys⁶ during the optimum survey period (August and September in sunny conditions). Any occupied larval webs will be recorded. › The results of habitat condition and larval web surveys will inform whether adaptive management measures are required to improve habitat structure, foodplant availability or overall suitability for marsh fritillary. <p>Hedgerow and Native Woodland Planting</p> <p>Monitoring of newly planted native hedgerows and woodland will be undertaken to assess establishment success, structural development and species composition.</p> <p>Monitoring will include:</p> <ul style="list-style-type: none"> › Survival rates of planted stock; › Identification of failed planting requiring replacement; › Assessment of early structural development; › Confirmation that management measures are being implemented as intended. 	Annually	As Necessary	Project Ecologist
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⁶ <https://biodiversityireland.ie/app/uploads/2021/11/Marsh-Fritillary-Larval-Survey-Form.pdf>

			<p>Any replacement planting or remedial management identified through monitoring will be implemented during the appropriate planting season and documented within the Monitoring Report.</p> <p>Hedgerows and woodland planting will be inspected annually as outlined in Section 3.3 of the BMEP (Appendix 6-5). Monitoring frequency may be reduced after establishment of these habitats has been completed to the satisfaction of the NPWS and ACP.</p>			
MX18	Birds	<p>EIAR Chapter 7</p> <p>Appendix 6-5</p> <p>Appendix 7-7</p>	<p>Bird Surveys of Enhancement Area</p> <ul style="list-style-type: none"> › The areas proposed for enhancement will be the subject of ongoing monitoring during the operational phase of the Proposed Wind Farm to ensure it is offering supporting habitat for breeding lapwing and roosting whooper swans. The ongoing monitoring will take place during the breeding bird season (March to August) for lapwing and winter (October to March) for whooper swan. The monitoring will seek to identify whether these species are utilising the areas under active management and will be conducted by way of vantage point surveys. These surveys will be undertaken once a month March to August and October to March inclusive, each year. This is discussed in detail in Appendix 7-7. › The area will be monitored as follows. The existing vantage point location VP6 is situated adjacent to, and overlooks, the proposed enhancement lands. Similarly, the existing breeding and winter walkover transects include this area. As such, these surveys will provide information on the usage of the proposed enhancement lands by whooper swan and lapwing. › Mapping: the proposed ornithological enhancement lands will be accurately mapped and monitored annually to check that the areas so covered have not altered in size and identify any issues, 	Annually	As Necessary	Project Ornithologist

			<p>e.g. embankments are intact, whether there are signs of erosion etc. As well as mapping, this monitoring will be recorded by means of fixed-point photography.</p> <ul style="list-style-type: none"> ○ A monitoring visit will be carried out each year as required to assess the condition of the fence and identify any areas for repair / replacement. ○ Annual monitoring of the sluice gate to assess the condition of the drop board etc. and replacing or repairing equipment as needed. ○ The requirement for mowing in the breeding lapwing area will be informed by monitoring. <p>› Vegetation sampling: Twenty fixed relevé sites will be set up in the breeding lapwing area. Data will be recorded prior to the commencement of the BMEP activities and annually in late winter thereafter. The character of each relevé will be recorded (e.g. species proportions present using Domin scale, vegetation height and percentage bare ground) and photographs will be taken of each relevé from a fixed point.</p> <ul style="list-style-type: none"> ○ The combination of the results from relevé and fixed-point photography will be used to inform when mowing is required in the breeding lapwing area. Thresholds are set in the methodology section above. ○ These relevés will then be re-examined annually ○ following the commencement of the BMEP to establish the extent of habitat improvement resulting from management practices. <p>The efficacy of the measures employed will be reviewed annually following the commencement of the BMEP. Analysis of the data collected will be the basis for a review of the measures and techniques employed. Should any adjustments to the measures be deemed necessary or advisable, these will be undertaken in consultation with the NPWS prior to any alterations to the BMEP.</p>			
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		<p>Monitoring Reports detailing the monitoring works carried out, the results obtained and a review of their success, along with any suggestions for amendments to the BMEP will be prepared and submitted to the planning authority annually following commencement of the BMEP. This report will fulfil an auditing function.</p> <p>Annual monitoring is proposed for the lifetime of the wind farm. However, a review of the requirement to continue with annual monitoring should be undertaken after the fifth operational year. Any change to the annual monitoring requirement will require NPWS and ACP sign-off.</p> <p>Bird Monitoring Programme</p> <p>Operational monitoring will be undertaken in prescribed monitoring years during the operational lifetime of the Proposed Wind Farm. The NatureScot guidance document '<i>Monitoring the impact of onshore wind farms on birds</i>' (SNH, 2009) requires that bird monitoring in wind farms should occur in years 1, 2, 3, 5, 10 and 15 after the turbines become operational. These monitoring requirements are proposed for the Proposed Wind Farm.</p> <p><u>Surveys</u></p> <p>The ornithological surveys that will be undertaken during the prescribed monitoring years are listed below and the methodology is outlined in the following sections:</p> <ul style="list-style-type: none"> › Flight activity surveys <ul style="list-style-type: none"> ○ Vantage Point Surveys › Distribution and Abundance Surveys 	<p>Years 1-5, 10 and 15</p>	<p>As Necessary</p>	
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			<ul style="list-style-type: none"> ○ Breeding bird surveys: Adapted Brown & Shepard; › Targeted bird collision surveys (corpse searches) will be undertaken by a trained dog and handler. The surveys will include detection and scavenger trials to correct for these two biases and ensure the resulting data is robust. › Enhancement Area Monitoring: <ul style="list-style-type: none"> ○ Breeding Lapwing area monitoring; ○ Whooper swan roost area monitoring; and ○ Barn owl box visits. 			
MX19	Noise and Vibration	<p>ELAR Chapter 12</p> <p>Appendix 12-6</p>	<p>Noise Compliance Monitoring Programme</p> <p>Noise Compliance Monitoring Programme refers to testing the wind turbine noise levels due to the Proposed Project against the planning conditions, in terms of overall noise levels.</p> <p>Prior to the commissioning of the wind farm, the developer will submit a to the planning authority for written agreement. The Noise Compliance Monitoring Programme will include a detailed methodology for the noise measurements, procedures for recording results and locations at which noise is to be monitored.</p> <p>Compliance noise surveys will be undertaken to verify compliance with any noise conditions applied to the development. It is common practice to commence surveys within six months of a wind farm being commissioned. The guidance outlined in the IOA GPG and Supplementary Guidance Note 5: Post Completion Measurements (July 2014) will be implemented.</p> <p>In the unlikely event that an exceedance of the noise criteria is identified as part of the commissioning assessment and relevant corrective actions taken. For example, implementation of noise reduced operational modes resulting in curtailment of turbine</p>	Once within six months	As Required	Noise Consultant

			<p>operation can be implemented for specific turbines in specific wind conditions to ensure turbine noise levels are within the relevant noise criterion or conditions turbine noise limits. Such curtailment can be applied using the wind farm SCADA system with a marginal reduction of the wind turbine performance. After the implementation of the mitigation measures, the noise survey will be repeated to confirm compliance with the planning conditions.</p> <p>Noise Complaint Management Protocol</p> <p>In the event of a noise-related complaint associated with the operation of the Proposed Project, the Operator will fully investigate the complaint in collaboration with the turbine manufacturer and in accordance with the agreed Noise Complaint Management Protocol.</p> <p>In the event of a complaint associated with noise for example, tonality or amplitude modulation from the Proposed Project, in line with the Noise Complaint Management Protocol documents to be submitted and agreed with the local authority), the operator will fully investigate the complaint in collaboration with the turbine manufacturer, through review of the meteorological periods and conditions.</p> <p>A Draft Noise Complaint Management Protocol for addressing AM or tonality presented in Appendix 12-6. A final version of this protocol will be contained within the Noise Complaint Management Protocol to be agreed the relevant Local Authority and/or Authorities.</p>			
MX20	Peat and Spoil Management / Instability	Appendix 4-3	To monitor possible peat movements following the construction of the Proposed Wind Farm, it is recommended that the site is inspected by a suitably qualified engineer once every six months for the first three years following commissioning of the Proposed Wind Farm.	As required	Every 6 Months	Geotechnical Engineer

		Appendix 8-1	Particular attention should be given to the peat deposition areas and the proposed borrow pits, as well to any areas where the site drainage is not functioning as intended. Should any signs of instability be noted, a site visit by a suitably qualified geotechnical engineer should be arranged and suitable remediation measures enacted and the site inspections should continue on an annual basis for a further three years.			
Decommissioning Phase						
MX21	Decommissioning	Appendix 4-8	<p>As noted in the Scottish Natural Heritage report (SNH) <i>Research and Guidance on Restoration and Decommissioning of Onshore Wind Farms</i> (SNH, 2013) reinstatement proposals for a wind farm are made approximately 30 years in advance, so within the lifespan of the wind farm, technological advances and preferred approaches to reinstatement are likely to change. According to the SNH guidance, it is therefore:</p> <p><i>“best practice not to limit options too far in advance of actual decommissioning but to maintain informed flexibility until close to the end-of-life of the wind farm”.</i></p> <p>In this regard, the Decommissioning Plan (DP) (Appendix 4-8) will be reviewed and updated prior to commencement of decommissioning works to take account of the relevant conditions of the planning permission and current health and safety standards at the time of decommissioning.</p>	End of Operational Life	As Required	Developer Appointed/ Contractor
MX22	Decommissioning	Appendix 4-8	The EnvCoW will maintain responsibility for monitoring the decommissioning works and Contractors/Sub-contractors from an environmental perspective. The EnvCoW will act as the regulatory interface on environmental matters. The Site Manager will be	End of Operational Life	As Required	Site Manager/ EnvCoW

			responsible for reporting to and liaising with Local Authority and other statutory bodies as required.			
MX23	Decommissioning	Appendix 4-8	The Site Manager in consultation with the EnvCoW will be responsible for employing the services of a suitably qualified ecologist and any other suitably qualified professionals as required throughout the decommissioning works.	End of Operational Life	As Required	Site Manager/ EnvCoW
MX24	Decommissioning	Appendix 4-8	Prior to decommissioning, a suitably qualified ecologist will complete an invasive species survey of the site to identify invasive species where any minor excavation will be required. If present in these areas, the ecologist will propose suitable management measures.	End of Operational Life	As Required	Project Ecologist
MX25	Health and Safety	Appendix 4-8	<ul style="list-style-type: none"> > Report on site activities to include but not limited to information on accidents and incidents, disciplinary action taken and PPE compliance; > Monitor the compliance of contractors and others and take corrective action where necessary; and > Notify the Authority and the client of non-compliance with any written directions issued. 	End of Operational Life	As Required	PSCS
MX26	Birds	Appendix 4-8 Appendix 7-7	<ul style="list-style-type: none"> > It is proposed that decommissioning works will commence outside the bird nesting season (1st of March to 31st of August inclusive) to avoid the most sensitive time of the year for most bird species with the potential to use the site and its environs. Pre-commencement surveys will be undertaken within one month prior to the initiation of works. The purpose of these surveys is to identify sensitive roosting sites. > If works run into the subsequent breeding season(s) (April-September), surveys will be conducted to identify sensitive nesting sites. Breeding season surveys will be conducted once per month from April to July inclusive of when works are taking place. If works run into the subsequent winter season(s) 	End of Operational Life	As Required	Project Ornithologist

			<p>(October to March), surveys will be repeated to identify sensitive roost sites. These surveys will be conducted at the beginning of each winter season (e.g., October) and continue if there is evidence to justify continuing (i.e. potential roosting behaviour of birds of conservation concern).</p> <p>> Surveys will be undertaken by a suitably qualified ornithologist. The survey will comprise a thorough walkover survey of the development footprint and/or all works areas to a 500m radius, where access allows. If winter roosts or nests of birds of high conservation concern are identified, the roost/nest will be earmarked for continued monitoring during works. If the roost/nest is found to be active during works, works will cease within a species-specific buffer of its location in line with best practice guidance (Forestry Commission Scotland, 2006; Goodship and Furness 2022; Ruddock and Whitfield, 2007) to avoid disturbance. No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied. Aerial surveys using a drone may be used to confirm the presence or absence of birds, where conditions are suitable.</p> <p>> 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 decommissioning staff. The restricted area will also be marked to alert all personnel on site to the suspension of works within that area.</p>			
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