

17. SCHEDULE OF MITIGATION AND MONITORING PROPOSALS

17.1 Introduction

All mitigation and monitoring measures relating to the pre-commencement, construction and operational phases of the Proposed Development are set out in the relevant chapters of the EIAR submitted as part of the planning permission application.

All mitigation which will be implemented during the pre-commencement, construction and operational phases of the project are presented in Table 17-1 below. The monitoring and mitigation measures have been grouped together according to their environmental field/topic and are presented under the following headings:

- > Construction Management
- > Drainage Design and Management
- > Peat, subsoils and bedrock
- > Population and Human Health
- > Shadow Flicker
- > Biodiversity
- > Ornithology
- > Noise
- > Air Quality/Dust
- > Traffic
- > Cultural Heritage

The mitigation proposals in the below format provides an easy to audit list that can be reviewed and reported on during the future phases of the project. The proposal 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 the course of future project phases to provide a reporting template for site compliance audits.

All monitoring measures which will be implemented during the pre-commencement, construction and operational phases of the project are outlined in Table 17-2. All monitoring measures relating to the pre-commencement, construction and operational phases of the development were set out in the relevant chapters of the EIAR submitted as part of the planning permission application. 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 project to ensure all the required monitoring is completed as required.

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

17.2

EIAR Mitigation Measures

Table 17-1 Schedule of Mitigation Lyrenacarriga Wind Farm

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
Pre-Commencement Phase					
<i>Pre- Commencement Construction Management</i>					
MM1	Environmental Management	EIAR Chapter 4	<p>Before the commencement of any felling works, the Environmental Clerk of works ECoW will</p> <ul style="list-style-type: none"> ➤ oversee the keyhole and extraction works. ➤ Attend the site for the setup period when drainage protection works are being installed and be present on site during the remainder of the forestry keyhole felling works. <p>Prior to the commencement of construction works, the ECoW will</p> <ul style="list-style-type: none"> ➤ 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). <p>During Construction works the EnvCoW will</p> <ul style="list-style-type: none"> ➤ 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 Section 3.4 (Monitoring and Recording) and Appendix 3 (Site 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<p>Monitoring Form (Visual Inspections)) of the <i>Forestry & Freshwater Pearl Mussel Requirements</i>.</p> <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"> ○ Surface water samples shall be collected upstream and downstream of the keyhole felling site at suitable sampling locations. ○ Sampling shall be taken from the stream / riverbank, with no in-stream access permitted. ○ The following minimum analytical suite shall be used: pH, Electrical Conductivity, Total Suspended Solids, Biochemical Oxygen Demand, Total Phosphorus, Ortho-Phosphate, Total Nitrogen, and Ammonia. ➤ Review of operator’s records for plant inspections, evidence of contamination and leaks, and drainage checks made after extreme weather conditions. ➤ Prepare and maintain a contingency plan. ➤ Suspend work where potential risk to water from siltation and pollution is identified, or where operational methods and mitigation measures are not specified or agreed. ➤ Prepare and maintain a Water Protection Measure Register. This document is to be updated weekly by the ECoW. 		
MM2	Site Drainage Plan	EIAR Chapter 4 and Chapter 10	<ul style="list-style-type: none"> ➤ The Project Hydrologist/Design Engineer will assist in preparing a site drainage plan before construction commences. ➤ 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
<i>Biodiversity</i>					
MM3	Effects on Rivers/Streams and Sensitive Aquatic Faunal Species	EIAR Chapter 7, Chapter 10, and CEMP Section 5	<ul style="list-style-type: none"> ➤ A detailed drainage maintenance plan for the Proposed Development is provided in Chapter 4, Section 4.6.8 of this EIAR with additional drainage details described in Section 4.6 generally. This plan provides details of how water quality will be protected during the construction of the Proposed Development. ➤ Prior to the commencement of construction works on site, the extent of the proposed infrastructure at this location will be marked out by the Project Engineer and Project Ecologist. The area will be clearly fenced off and appropriate fencing erected. This will further minimise any potential for unnecessary habitat loss. If required, limb removal of individual branches will be undertaken, under the provisions of the Wildlife Act, as a preference to the loss of the entire tree. Such measures would allow for regrowth following turbine delivery. 		
MM4	Effects on Fauna and Marsh Fritillary	EIAR Chapter 7, CEMP Section 5	<ul style="list-style-type: none"> ➤ On a precautionary basis, a pre-commencement badger survey will be undertaken in accordance with standard best practice guidance (TII, 2005) prior to the commencement of site works to confirm the conditions predicted in this EIAR. If a badger sett is identified within or immediately adjacent to the proposed development footprint, a badger sett disturbance licence will be sought from the National Parks and Wildlife Service. ➤ Exclusion zone fencing/berm and appropriate signage will be put in place along the section of haul road, where an existing cul-de-sac forestry spur road could provide vehicular access closer to the identified badger sett. This existing forestry access track will therefore be closed to any vehicular traffic/parking during the construction phase to avoid any unnecessary storage of vehicles etc . 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ➤ On a precautionary basis, a pre-commencement otter survey will be undertaken in accordance with standard best practice guidance prior to the commencement of site works. In the unlikely event that an otter holt is identified within or immediately adjacent to the proposed development footprint, consultation will be undertaken with the National Parks and Wildlife Service and a derogation licence applied for. ➤ All conditions of a derogation licence will be implemented in full. ➤ No works will be undertaken within 150m of any holts at which breeding females or cubs are present. ➤ No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance will also not take place within 15m of such holts, except under licence (TII, 2006¹). ➤ Area of suitable marsh friterrary habitat and associated colony will be fenced off or clearly marked prior to the commencement of any site works under the guidance and supervision of a suitably qualified Project Ecologist who will fulfil the role of Ecological Clerk of Works <p>All of the above works will be undertaken or supervised by an appropriately qualified ecologist</p>		
Construction Phase					
<i>Construction Management</i>					

¹ NRA, 2006. *Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes*. Dublin: Transport Infrastructure Ireland. Available at: www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Treatment-of-Otters-prior-to-the-Construction-of-National-Road-Schemes.pdf

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
MM5	Health and Safety	EIAR Chapter 5	<p>During construction of the Proposed Development, all staff will be made aware of and adhere to:</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) Regulations 2007 (S.I. No. 299 of 2007), as amended; ➤ Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. 291 of 2013), as amended; and ➤ Safety, Health and Welfare at Work (Work at Height) Regulations 2006 (S.I. No. 318 of 2006). <p>This will encompass the use of all necessary Personal Protective Equipment and adherence to the site Health and Safety Plan which will include measures to exclude members of the public from certain areas of the site during construction.</p>		
MM6	Health and Safety	EIAR Chapter 4	<p>Stock-proof fencing (where required) will be erected around the borrow pit (s) and peat and spoil repositories if deemed necessary to prevent uncontrolled access to this area. Appropriate health and safety signage will also be erected on this fencing and at locations around the site</p>		
MM7	Refuelling	EIAR Chapters 4, 5 7,10	<ul style="list-style-type: none"> ➤ Minimal refuelling or maintenance of construction vehicles or plant will take place on site. ➤ On-site refuelling will be carried out using a mobile double skinned, bunded fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled off site and will be towed around the site by a 4x4 jeep to where machinery is located. It is not practical for 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<p>all vehicles to travel back to a single refuelling point, given the size of the cranes, excavators, etc. that will be used during the construction of the proposed wind farm development. The 4x4 jeep will also carry fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction when not in use. Refuelling operations will be carried out only by designated trained and competent operatives under a Permit to Refuel process. Mobile anti-pollution measures such as drip trays and fuel absorbent mats will be used during all refuelling operations</p> <ul style="list-style-type: none"> ➤ Fuels volumes stored on site will be minimised. Any fuel storage areas will be bunded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor; ➤ The electrical 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; and, ➤ An emergency plan for the construction phase to deal with accidental spillages will be contained within Emergency Response Plan (Section 6 of CEMP). Spill kits will be available to deal with an accidental spillage 		
MM8	Reinstatement	EIAR Chapter 4	A portion of excavated overburden material will be stored temporarily adjacent to the works areas for reinstatement when the main construction activities are completed. Soil will be backfilled outside the drainage channels along track-sides and vegetated sods replaced over the surface, bedded-in, regraded, etc., to re-constitute a stable and settled ground		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			surface on which the natural vegetation can recover and will be resistant to erosion.		
<i>Drainage Design and Management</i>					
MM9	Clear Felling of Coniferous Plantation	EIAR Chapter 4, Chapter 10	<p>The following Guidance will be adhered to</p> <ul style="list-style-type: none"> ➤ Forestry Commission (2004): Forests and Water Guidelines, Fourth Edition. Publ. Forestry Commission, Edinburgh; ➤ Coillte (2009): Forest Operations and Water Protection Guidelines; ➤ Coillte (2009): Methodology for Clear Felling Harvesting Operations; ➤ Forest Service (Draft): Forestry and Freshwater Pearl Mussel Requirements – Site Assessment and Mitigation Measures; and, ➤ Forest Service (2000): Forestry and Water Quality Guidelines. Forest Service, DAF, Johnstown Castle Estate, Co. Wexford <p>A self-imposed conservative buffer zone of 75 metres will be maintained for all streams where possible; with the exception of existing road/crossing upgrades and proposed stream crossings, the proposed tree felling areas are generally located outside of imposed buffer zones. The large distance between the majority of the proposed felling areas and sensitive aquatic zones means that potential poor-quality runoff from felling areas can be adequately managed and attenuated prior to even reaching the aquatic buffer zone and primary drainage routes.</p> <p>Where tree felling is required in the vicinity of streams, the following additional mitigation measures will be employed.</p> <ul style="list-style-type: none"> ➤ Machine combinations (i.e. handheld or mechanical) will be chosen which are most suitable for ground conditions and which will minimise soils disturbance; ➤ Checking and maintenance of roads and culverts will be on-going through any felling operation. No tracking of vehicles through watercourses will occur, as vehicles will use road infrastructure and 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<p>existing watercourse crossing points. Where possible, existing drains will not be disturbed during felling works;</p> <ul style="list-style-type: none"> ➤ Removing clay, soil, silts from roads during wet periods and dust suppression during dry spells; ➤ Ditches which drain from the proposed area to be felled towards existing surface watercourses will be blocked, and temporary silt traps will be constructed. No direct discharge of such ditches to watercourses will occur. Drains and sediment traps will be installed during ground preparation. Collector drains will be excavated at an acute angle to the contour (-0.3%-3% gradient), to minimise flow velocities. Main drains to take the discharge from collector drains will include water drops and rock armour, as required, where there are steep gradients, and will avoid being placed at right angles to the contour; ➤ Sediment traps will be sited in drains downstream of felling areas. Machine access will be maintained to enable the accumulated sediment to be excavated. Sediment will be carefully disposed of in the disposal areas. Where possible, all new silt traps will be constructed on even ground and not on sloping ground; ➤ In areas particularly sensitive to erosion or where felling inside the 75-metre buffer is required, it will be necessary to install double or triple sediment traps; ➤ All drainage channels will taper out before entering the 75m buffer zone. This ensures that discharged water gently fans out over the buffer zone before entering the aquatic zone, with sediment filtered out from the flow by ground vegetation within the zone. On erodible soils, silt traps will be installed at the end of the drainage channels, to the outside of the buffer zone; ➤ Drains and silt traps will be maintained throughout all felling works, ensuring that they are clear of sediment build-up and are not severely 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<p>eroded. Correct drain alignment, spacing and depth will ensure that erosion and sediment build-up are minimized and controlled;</p> <ul style="list-style-type: none"> ➤ Brush mats will be used to support vehicles on soft ground, reducing mineral soils erosion and avoiding the formation of rutted areas, in which surface water ponding can occur. Brush mat renewal will take place when they become heavily used and worn. Provision will be made for brush mats along all off-road routes, to protect the soil from compaction and rutting. Where there is risk of severe erosion occurring, extraction will be suspended during periods of high rainfall; ➤ Timber will be stacked in dry areas, and outside a local 75 metre watercourse buffer. Straw bales and check dams to be emplaced on the down gradient side of timber storage/processing sites; ➤ Works will be carried out during periods of no, or low rainfall, in order to minimise entrainment of exposed sediment in surface water run-off; ➤ Checking and maintenance of roads and culverts will be on-going through the felling operation; ➤ Refuelling or maintenance of machinery will not occur within 100m of a watercourse. Mobile bowser, spill kits, qualified personnel will be used where refuelling is required; ➤ A permit to refuel system will be adopted; ➤ Branches, logs or debris will not be allowed to build up in aquatic zones. All such material will be removed when harvesting operations have been completed, but care will be taken to avoid removing natural debris deflectors; ➤ Crossing of streams will not be permitted; ➤ Trees will be cut manually from along streams and using machinery to extract whole tree; and Travel only perpendicular to and away from stream. 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
MM10	Silt Traps	EIAR Chapter 4, Chapter 10	Silt traps will be strategically placed down-gradient within forestry drains near streams. The main purpose of the silt traps and drain blocking is to slow water flow, increase residence time, and allow settling of silt in a controlled manner.		
MM11	Drain Inspection and Maintenance	EIAR Chapter 4, Chapter 10	<p>The following items shall be carried out during pre-felling inspections:</p> <ul style="list-style-type: none"> ➤ Communication with tree felling operatives in advance to determine whether any areas have been reported to experience unusual water logging or bogging of machines; ➤ Inspection of all areas reported as having unusual ground conditions; ➤ Inspection of main drainage ditches and outfalls. During pre-felling inspections, the main drainage ditches shall be identified. Ideally the pre-felling inspection shall be carried out during rainfall; ➤ Following tree felling all main drains shall be inspected to ensure that they are functioning; ➤ Extraction tracks nears drains need to be broken up and diversion channels created to ensure that water in the tracks spreads out over the adjoining ground; ➤ Culverts on drains exiting the site will be unblocked; and, ➤ All accumulated silt will be removed from drains and culverts, and silt traps, and this removed material will be deposited away from watercourses to ensure that it will not be carried back into the trap or stream during subsequent rainfall. 		
MM12	Surface Water Quality Monitoring	EIAR Chapter 4, Chapter 10	<ul style="list-style-type: none"> ➤ Appropriate interceptor drainage, to prevent up-slope surface runoff from entering excavations will be put in place; ➤ If required, pumping of excavation inflows will prevent build-up of water in the excavation; 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ➤ The interceptor drainage will be discharged to the site constructed drainage system or onto natural vegetated surfaces and not directly to surface waters; ➤ The pumped water volumes will be discharged via volume and sediment attenuation ponds adjacent to excavation areas, or via specialist treatment systems such as a Siltbuster unit; ➤ There will be no direct discharge to surface watercourses, and therefore no risk of hydraulic loading or contamination will occur; ➤ Daily monitoring of excavations by a suitably qualified person will occur during the construction phase. If high levels of seepage inflow occur, excavation work will immediately be stopped and a geotechnical assessment undertaken; and, ➤ A mobile ‘Siltbuster’ or similar equivalent specialist treatment system will be available on-site for emergencies in order to treat sediment polluted waters from settlement ponds or excavations should they occur. Siltbusters are mobile silt traps that can remove fine particles from water using a proven technology and hydraulic design in a rugged unit. The mobile units are specifically designed for use on construction-sites. They will be used as a final line of defence if needed 		
MM13	Earthworks (Removal of Vegetation Cover, Excavations and Stock Piling)	EIAR Chapter 4, Chapter 10	<ul style="list-style-type: none"> ➤ Drainage and seepage water resulting from infrastructure excavation; ➤ Stockpiled excavated material providing a point source of exposed sediment; ➤ Construction of the collector cable trench resulting in entrainment of sediment from the excavations during construction; and, ➤ Erosion of sediment from emplaced site drainage channels. ➤ Apart from interceptor drains, which will convey clean runoff water to the downstream drainage system, there will be no direct discharge (without treatment for sediment reduction, and attenuation for flow 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<p>management) of runoff from the proposed wind farm drainage into the existing site drainage network. This will reduce the potential for any increased risk of downstream flooding or sediment transport/erosion;</p> <ul style="list-style-type: none"> ➤ Silt traps will be placed in the existing drains upstream of any streams where construction works / tree felling is taking place, and these will be diverted into proposed interceptor drains, or culverted under/across the works area; ➤ Runoff from individual turbine hardstanding areas will be not discharged into the existing drain network but discharged locally at each turbine location through stilling ponds and buffered outfalls onto vegetated surfaces; ➤ Buffered outfalls which will be numerous over the site will promote percolation of drainage waters across vegetation and close to the point at which the additional runoff is generated, rather than direct discharge to the existing drains of the site; and, ➤ Drains running parallel to the existing roads requiring widening will be upgraded, widening will be targeted to the opposite side of the road. Velocity reducing and silt control measures such as check dams, sandbags, oyster bags, straw bales, flow limiters, weirs, baffles, silt fences will be used during the upgrade construction works. Regular buffered outfalls will also be added to these drains to protect downstream surface waters. 		
MM14	Settlement ponds	EIAR Chapter 4, Chapter 10	<ul style="list-style-type: none"> ➤ Settlement ponds, placed either singly or a pair in series, will buffer volumes of run-off 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 water courses as per the drainage design. 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
MM15	Water Treatment Train	EIAR Chapter 4, Chapter 10	<ul style="list-style-type: none"> > A water treatment train such as a “Siltbuster” if required. If the discharge water from construction areas fails to be of a high quality during the daily inspections then a filtration treatment system (such as a ‘Siltbuster’ or similar equivalent treatment train (sequence of water treatment processes) will be used to filter and treat all surface discharge water collected in the dirty water drainage system. This will apply for all of the construction phase. 		
MM16	Silt Bags	EIAR Chapter 4, Chapter 10	<ul style="list-style-type: none"> > Silt bags will be used where small to medium volumes of water need to be pumped from excavations. As water is pumped through the bag, the majority of the sediment is retained by the geotextile fabric allowing filtered water to pass through. Silt bags will be used with natural vegetation filters or sedimats, Sediment entrapment mats, consisting of coir or jute matting, will be placed at the silt bag location to provide further treatment of the water outfall from the silt bag. Sedimats will be secured to the ground surface using stakes/pegs. The sedimat will extend to the full width of the outfall to ensure all water passes through this additional treatment measure. A water treatment train such as a “Siltbuster” if required. If the discharge 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
MM17	Potential Release of Hydrocarbons	EIAR Chapter 4, Chapter 10	<ul style="list-style-type: none"> ➤ On site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled off site and will be towed around the site by a 4x4 jeep to where machinery is located. The 4x4 jeep will also carry fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use and only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations; ➤ Onsite refuelling will be carried out by trained personnel only; ➤ A permit to fuel system will be put in place; ➤ Fuels stored on site will be minimised. Fuel storage areas if required will be bunded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor; ➤ The plant used during construction will be regularly inspected for leaks and fitness for purpose; and, ➤ An emergency plan for the construction phase to deal with accidental spillages is included within the CEMP (Appendix 4-4 of this EIAR). Spill kits will be available to deal with and accidental spillage in and outside the re-fuelling area. 		
MM18	Release of Cement-Based Products	EIAR Chapter 4, Chapter 10	<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. 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ➤ Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water will be undertaken at lined cement washout ponds. ➤ The pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event. 		
MM19	Morphological Changes to Surface Water Courses & Drainage Patterns	EIAR Chapter 4, Chapter 10	<ul style="list-style-type: none"> ➤ All proposed new stream crossings will be bottomless or clear span culverts and the existing banks will remain undisturbed. No in-stream excavation works are proposed and therefore there will be no direct impact on the stream at the proposed crossing location; ➤ Where the proposed underground cabling route follows an existing road or road proposed for upgrade, the cable will pass over or below the culvert within the access road; ➤ All guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland is incorporated into the design of the proposed crossings; ➤ As a further precaution, near stream construction work, will only be carried out during the period permitted by Inland Fisheries Ireland for in-stream works according to the Eastern Regional Fisheries Board (2004) guidance document “Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites”, i.e., May to September inclusive. This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI); 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ➤ During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas; and, ➤ All new river/stream crossings will require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent. 		
MM20	Hydrological Impacts on Downstream Designated Sites	EIAR Chapter 4, Chapter 10	<ul style="list-style-type: none"> ➤ 75m buffer zones and drainage control measures (i.e. interceptor drains, swales, stilling ponds), will ensure that the quality of runoff from proposed development areas will be very high. 		
MM21	Surface Water Quality Impacts on the Youghal Public Water Supply Abstractions	EIAR Chapter 4, Chapter 10, CEMP Section 5	<p>The design includes for measures such as 75m buffer from watercourses and in control measures (silt busters, check dams etc) to prevent any potential impact on the Youghal Public Water Supply. The implementation of the below will also be incorporated:</p> <ul style="list-style-type: none"> ➤ Detailed Drainage Management Design 10.5.2 and 10.5.3 of the EIAR? ➤ Daily inspections will be undertaken to assess the effectiveness of the water treatment trains 		
MM22	Turbine Delivery Route Works	EIAR Chapter 10	<ul style="list-style-type: none"> ➤ Silt traps will be temporarily be placed in all drains intercepted by the works prior to works commencing ➤ Silt fence perimeters will be placed downslope of the works before excavations begin ➤ At the Breeda Bridge proposed access road temporary drains (interceptor and collector drains) and settlement ponds will be put in place to deal with surface water runoff. 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
Construction Management					
MM23	Plant and equipment inspections	EIAR Chapter 4	<ul style="list-style-type: none"> Site plant will be regularly inspected for leaks and fitness for purpose; and an emergency plan for the construction phase to deal with accidental spillages will be contained within the Construction Environmental Management Plan. Spill kits will be available to deal with accidental spillages. 		
MM24	Wastewater Disposal	EIAR Chapter 4	<ul style="list-style-type: none"> Temporary port-a-loo toilets located within a staff portacabin will be used during the construction phase. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by an appropriately consented waste collector to wastewater treatment plants. 		
MM25	Concrete Deliveries and Management	EIAR Chapter 4	<ul style="list-style-type: none"> No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products will be used and where possible, pre-cast elements for culverts and concrete works will be used. 		
MM26	Concrete Deliveries and Management	EIAR Chapter 4	<ul style="list-style-type: none"> No washing out of any plant used in concrete transport or concreting operations will be allowed on-site, save for chute cleaning as described below 		
MM27	Concrete Deliveries and Management	EIAR Chapter 4	<ul style="list-style-type: none"> Where concrete is delivered on site, only the chute need be cleaned, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water is to be directed into a dedicated lined washout area. This lined area will be removed from site once the construction phase is complete. 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
MM28	Concrete Deliveries and Management	EIAR Chapter 4	<ul style="list-style-type: none"> Weather forecasting will be used to plan dry days for pouring concrete. Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event 		
MM29	Concrete Deliveries and Management	EIAR Chapter 4	<ul style="list-style-type: none"> The use of pre-cast elements for culverts and concrete works will be prioritised. 		
<i>Peat, Subsoils and Bedrock</i>					
MM30	Soil, Subsoil and Bedrock Excavation	EIAR Chapter 9	<ul style="list-style-type: none"> Use of the existing forestry road network as much as possible to reduce soil/subsoil excavation and borrow pit volumes; The soil and subsoil which will be removed during the construction phase will be localised to the Proposed Development infrastructure locations; No turbines or related infrastructure will be constructed near or on any designated sites such as NHAs or SACs; A minimal volume of soil 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. 		
MM31	Ground/Slope Instability and Failure	EIAR Chapter 9	<ul style="list-style-type: none"> Based on the Geotechnical Assessment Report there is no evidence of past failures nor were there any signs of instability noted on the proposed development site. However, the Geotechnical Assessment Report (Appendix 4-2) provides recommendations which will be implemented regarding wind farm infrastructure construction, borrow pit construction and spoil placement/storage. 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
MM32	Contamination of Soil by Leakages and Spillages and Alteration of Peat/Soil Geochemistry	EIAR Chapter 9	<ul style="list-style-type: none"> ➤ On site re-fuelling will be undertaken by suitably trained personnel only; ➤ Fuels stored on site will be minimised. Storage areas where required will be bunded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor; ➤ The electrical 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; ➤ The plant used during construction will be regularly inspected for leaks and fitness for purpose; ➤ All waste tar material arising from the chipping and resurfacing of the temporary construction access road will be removed off-site and taken to licenced waste facility; and, ➤ An emergency plan for the construction phase to deal with accidental spillages is contained within the Construction and Environmental Management Plan (Appendix 4-4 of this EIAR). Spill kits will be available to deal with accidental spillage in and outside the re-fuelling area. 		
MM33	Erosion of Exposed Subsoils and Soil During Tree Felling, Access Road and Turbine Base Construction Work	EIAR Chapter 9, CEMP Section 5	<ul style="list-style-type: none"> ➤ All excavated material will be managed in accordance with the measures presented in the Geotechnical Assessment Report – see Appendix 4-2. Material will be moved over the least possible distance. ➤ Any excess spoil will be moved to storage areas or will be temporarily surrounded by earthen berms to prevent erosion. This will prevent erosion of soil. Silt fences will be installed around temporary stockpiles to limit movement of entrained sediment in surface water runoff. The 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<p>use of earthen berms and silt fencing around earthworks and spoil mounds will prevent egress of water from the works.</p> <ul style="list-style-type: none"> ➤ In order to minimise erosion of mineral subsoils, stripping of topsoil will not take place during extremely wet periods² (to prevent increased silt rich runoff). Temporary drainage systems (Please see Drainage Management Plan) will be required to limit runoff impacts during the construction phase. ➤ During tree felling, brash mats will be used to support vehicles on soft ground, reducing soil and mineral subsoil erosion and avoiding the formation of rutted areas, in which surface water ponding can occur. Brash mat renewal will take place when they become heavily used and worn. Provision will be made for brash mats along all off-road routes, to protect the soil from compaction and rutting. 		
Biodiversity					
MM34	Environmental Management- Invasive Species	EIAR Chapter 6	The control of invasive alien species will follow guidelines issued by the National Roads Authority - <i>The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads</i> (NRA 2010 ³). Best practice measures in relation to invasive species are described below:		

² >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.

³ NRA, 2010, *National Roads Authority - The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads*, Online, Available at: <https://www.tii.ie/tii-library/environment/construction-guidelines/Management-of-Noxious-Weeds-and-Non-Native-Invasive-Plant-Species-on-National-Road-Schemes.pdf>, Accessed 09.12.2020

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> <li data-bbox="1003 389 1787 619">➤ Where works cannot avoid areas of Rhododendron, the proposed method of removal is by means of cutting and digging. This will be carried out by a suitably qualified individual familiar with Rhododendron and the potential risks associated with the plant. Firstly, all overgrowth will be removed by means of cutting. This will take place outside of the optimal seed dispersal period (Feb-May) (Edwards, 2006). <li data-bbox="1003 624 1787 715">➤ Any stumps and roots which require removal during the cable installation/windfarm development will be removed either manually or by using a digger. <li data-bbox="1003 719 1787 842">➤ To avoid regrowth, Rhododendron material removed will be mulched and spread within the site. If stumps cannot be mulched these will be buried upside down at a depth of 2m in a designated location within the site. <li data-bbox="1003 847 1787 938">➤ All Rhododendron material will be stockpiled in a clearly defined fenced off area within the site. All fencing will be monitored and maintained for the duration of the works. <li data-bbox="1003 943 1787 1114">➤ On completion of the proposed development, the site will be monitored for Rhododendron encroachment. Any encroachment will be sprayed and/or removed via the above treatment methods. Any spraying will be carried out with a suitable herbicide following the manufactures instructions. <li data-bbox="1003 1118 1787 1311">➤ Good construction site hygiene will be employed to prevent the spread of these species with vehicles thoroughly cleaned down prior to leaving any site with the potential to have supported invasive species. All plant and equipment employed on the construction site (e.g. excavator, footwear, etc.) will be thoroughly cleaned down on site to prevent the spread of invasive plant. All clean down must be 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<p>undertaken in areas with no potential to result in the spread of invasive species.</p> <p>Any material that is imported onto any site will be verified by a suitably qualified ecologist to be free from any invasive species listed on the ‘Third Schedule’ of Regulations 49 & 50 of Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011). This will be carried out by searching for rhizomes and plant material.</p>		
MM35	Habitat maintenance	EIAR Chapter 7	<ul style="list-style-type: none"> ➤ Prior to the commencement of construction works on site, the extent of the proposed infrastructure at this location will be marked out by the Project Engineer and Project Ecologist. The area will be clearly fenced of and appropriate fencing erected. This will further minimise any potential for unnecessary habitat loss. If required, limb removal of individual branches will be undertaken, under the provisions of the Wildlife Act, as a preference to the loss of the entire tree. Such measures would allow for regrowth following turbine delivery ➤ In order to offset for the loss of hedgerow and treeline habitat to the proposed development (predominantly associated with bat mitigation measures), it is also proposed to plant 236 linear metres of new hedgerow within large areas of agricultural/arable lands to increase connectivity locally. The locations in which the proposed planting will be located will be subject to final landowner agreement. However, indicative areas for planting are proposed in Figure 7-13. The species composition will be similar to that in the surrounding landscape i.e. hawthorn, blackthorn and semi-mature native tree species. There will therefore be no net loss in hedgerow or treeline habitat. In addition, 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			connectivity to the wider landscape will be maintained around turbines where hedgerows and treelines are retained.		
MM36	Impact on Fauna and Marsh Fritillary	EIAR Chapter 7, CEMP Section 5	<ul style="list-style-type: none"> ➤ No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance will also not take place within 15m of such holts, except under licence (TII, 2006). ➤ In order to avoid any potential for indirect effects on otter and Sensitive Aquatic Faunal Species, via deterioration in water quality, a detailed drainage maintenance plan for the Proposed Development is provided ➤ Area of suitable marsh fritillary habitat and associated colony will be fenced off or clearly marked prior to the commencement of any site works under the guidance and supervision of a suitably qualified Project Ecologist who will fulfil the role of Ecological Clerk of Works 		
<i>Ornithology</i>					
MM37	Breeding Bird Disturbance	EIAR Chapter 4, Chapter 8, NIS.	<ul style="list-style-type: none"> ➤ 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. ➤ The removal of woody vegetation will be undertaken outside the bird breeding season which runs from the 1st of March to the 31st of August inclusive. 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. ➤ Plant machinery will be turned off when not in use. 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ➤ All plant and equipment for use will comply with best practise Construction Plant and Equipment Permissible Noise Levels Regulations and other relevant legislation. ➤ A Project Ecologist who will fulfil the role of Ecological Clerk of Works will be appointed. Duties will include: <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 Proposed Development site. ○ Oversee management of ornithological and ecological issues during the construction period and advise on ornithological issues as they arise. ○ Provide guidance to contractors to ensure legal compliance with respect to protected species onsite. ○ Liaise with officers of consenting authorities and other relevant bodies with regular updates in relation to construction progress. 		
MM38	Impact on Wetland and Waterbirds	EIAR Chapter 8 and NIS	<p>Mitigation measures have been incorporated into the proposed development for the prevention of water pollution. The proposed development includes a detailed drainage plan that is included in full in Section 4.7, Chapter 4 of the EIAR (Appendix 3 to this NIS).</p> <ul style="list-style-type: none"> ➤ Drains will be excavated and stilling ponds constructed to eliminate any suspended solids within surface water running off the site. The following best practice drainage measures have been incorporated into the proposed development for the protection of water quality, as fully described in Section 3.2.4.2 of the CEMP, see Appendix 4-4, Appendix 3 of this NIS: 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ➤ Interceptor drains will be maintained up-gradient of all proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then be directed to areas where it can be re-distributed over the ground by means of a level spreader. ➤ Swales/roadside drains will be maintained to intercept and collect runoff from access roads and hardstanding areas of the site, likely to have entrained suspended sediment, and channel it to stilling ponds for sediment settling; ➤ Check dams will be maintained at regular intervals along interceptor drains and swales/roadside drains in order to reduce flow velocities and therefore minimise erosion within the system during storm rainfall events; and, ➤ Stilling ponds/settlement ponds, emplaced downstream of swales and roadside drains, will buffer volumes of runoff discharging from the drainage system during periods of high rainfall, by retaining water until the storm hydrograph has receded, thus reducing the hydraulic loading to watercourses. The stilling ponds will be sized according to the size of the area they will be receiving water from but will be sufficiently large to accommodate peak flows storm events. Inspection and maintenance of all settlement ponds will be ongoing through the construction period. 		
Noise & Vibration					
MM39	Plant, machinery and vehicular noise emissions <i>BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on</i>	EIAR Chapter 4, Chapter 5 and Chapter 13.	<ul style="list-style-type: none"> ➤ No plant used on site will be permitted to cause an on-going public nuisance due to noise. ➤ The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations. 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
	<i>construction and open sites – Vibration</i>		<ul style="list-style-type: none"> ➤ All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract. ➤ Compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers. ➤ Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use. ➤ Any plant, such as generators or pumps, which is required to operate before 07:00hrs or after 19:00hrs will be surrounded by an acoustic enclosure or portable screen. ➤ During the course of the construction programme, supervision of the works will include ensuring compliance with the limits detailed in Table 4-2 using methods outlined in British Standard <i>BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise</i>. ➤ The hours of construction activity will be limited to avoid unsociable hours where possible. Construction operations shall generally be restricted to between 7:00hrs and 19:00hrs Monday to Saturday. However, to ensure that optimal use is made of good weather period or at critical periods within the programme it could occasionally be necessary to work out with these hours. Any such out of hours working would be agreed in advance with the local planning authority. 		
MM40	Rock Breaking <i>BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on</i>	EIAR Chapter 5 and Chapter 13	Specific to blasting (if undertaken) the following mitigation measures will be employed to control the impact during blasts: <ul style="list-style-type: none"> ➤ Restriction of hours within which blasting can be conducted (e.g. 09:00 – 18:00hrs). ➤ Notification to nearby residents before blasting starts (e.g. 24-hour written notification). 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
	<i>construction and open sites – Vibration</i>		<ul style="list-style-type: none"> ➤ The firing of blasts at similar times to reduce the ‘startle’ effect. ➤ The implementation of an onsite documented complaints procedure. ➤ The use of independent monitoring by external parties for verification of results. ➤ Trial blasts in less sensitive areas to assist in blast designs and identify potential zones of influence. ➤ 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 line are sealed. ➤ Use a dampened bit to eliminate ringing. ➤ Erect acoustic screen between compressor or generator and noise sensitive area. When possible, line of sight between top of machine and reception point needs to be obscured. ➤ Enclose breaker or rock drill in portable or fixed acoustic enclosure with suitable ventilation. ➤ No plant used on site will be permitted to cause an on-going public nuisance due to noise. ➤ The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations. ➤ 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. 		
MM41	<i>BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on</i>	EIAR Chapter 5 and Chapter 13	Where rock breaking is employed in relation to the proposed borrow pit location, the following are examples of measures that will be employed, where necessary, to mitigate noise emissions from these activities:		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
	<i>construction and open sites – Noise; Vibration</i>		<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. ➤ Use a dampened bit to eliminate ringing. ➤ Erect acoustic screen between compressor or generator and noise sensitive area. When possible, line of sight between top of machine and reception point needs to be obscured. ➤ Enclose breaker or rock drill in portable or fixed acoustic enclosure with suitable ventilation. 		
<i>Air Quality/Dust</i>					
MM42	Dust	EIAR Chapter 4, Chapter 5 and Chapter11	<ul style="list-style-type: none"> ➤ In periods of extended dry weather, dust suppression may be necessary along haul roads, site roads, around borrow pit areas and other infrastructure to ensure dust does not cause a nuisance. If necessary, water will be taken from stilling ponds in the site’s drainage system and pumped into a bowser or water spreader to dampen down haul roads, 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. ➤ All plant and materials vehicles shall be stored in dedicated areas (on site). ➤ Areas of excavation will be kept to a minimum, and stockpiling will be minimised by coordinating excavation, spreading and compaction. ➤ Turbines and construction materials will be transported to site on specified haul routes only. ➤ The agreed haul route roads adjacent to the site will be regularly inspected for cleanliness and cleaned as necessary. Any clay, soil or silty material deposited by site traffic will be removed from the roads 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<p>to maintain the stoned running surface. This removal of spoil material can have a substantial reduction effect of dust production in dry spells. Removed spoil material will be transported to the borrow pit or other suitable storage location for containment and storage.</p> <ul style="list-style-type: none"> ➤ The transport of construction materials to the site that have significant potential to cause dust, will be undertaken in tarpaulin or similar covered vehicles where necessary. ➤ The transport of spoil that has the significant potential to generate dust, to the on-site borrow pits will be minimised. If necessary, excavated spoil will be dampened prior to transport to the borrow pits. ➤ A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-4). The CEMP includes dust suppression measures. ➤ The designated public roads outside the site and along the main transport routes to the site will be regularly inspected by the Site Environmental Clerk of Works for cleanliness, and cleaned as necessary; ➤ Material handling systems and material storage areas will be designed and laid out to minimise exposure to wind; ➤ Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods; ➤ Water misting or bowsers will operate on-site as required to mitigate dust in dry weather conditions; ➤ The transport of soils or other material, which has significant potential to generate dust, will be undertaken in tarpaulin-covered vehicles where necessary; ➤ All construction related traffic will have speed restrictions on un-surfaced roads to 15 kph; 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ➤ Daily inspection of construction sites to examine dust measures and their effectiveness. ➤ When necessary, sections of the haul route will be swept using a truck mounted vacuum sweeper; and, ➤ All vehicles leaving the construction areas of the site will pass through a wheel cleansing area prior to entering the local road network 		
MM43	Exhaust Emissions	EIAR Chapter 4, Chapter 5 and Chapter 11	<ul style="list-style-type: none"> ➤ When stationary, delivery and on-site vehicles will be required to turn off engines. ➤ Users of the site will be required to ensure that all plant and vehicles are suitably maintained to ensure that emissions of engine generated pollutants are kept to a minimum. ➤ The majority of aggregate materials for the construction of the Proposed Development will be obtained from borrow pits on the site of the Proposed Development. This will significantly reduce the number of delivery vehicles accessing the site, thereby reducing the amount of emissions associated with vehicle movements. 		
MM44	Greenhouse Gas Emissions	EIAR Chapter 11	<ul style="list-style-type: none"> ➤ All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise. ➤ Turbines and construction materials will be transported to the site on specified routes only unless otherwise agreed with the Planning Authority. ➤ The majority of aggregate materials for the construction of the proposed wind farm will be obtained from the three proposed borrow pits on the site of the Proposed Development. This will significantly reduce the number of delivery vehicles accessing the site, thereby reducing the amount of emissions associated with vehicle movements. 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
Traffic					
MM45	Liaison with the relevant local authority	EIAR Chapter 5 and Chapter 15	<ul style="list-style-type: none"> Liaison with the relevant local authority including the roads section of local authorities that the delivery routes traverse and An Garda Síochána, during the delivery phase. 		
MM46	Travel Plans for Construction Workers	EIAR Chapter 5 and Chapter 15	<ul style="list-style-type: none"> The construction company will be required to provide a travel plan for construction staff, which will include the identification of a routes to / from the site and identification of an area for parking. 		
MM47	Temporary traffic signs	EIAR Chapter 5 and Chapter 15, CEMP Section 4	<ul style="list-style-type: none"> As part of the traffic management measures temporary traffic signs will be put in place at all key junctions, including the access junction on the N15. All measures will be in accordance with the “Traffic Signs Manual, Chapter 8 – Temporary Traffic Measures and Signs for Road Works” (DoT now DoTT&S) and “Guidance for the Control and Management of Traffic at Roadworks” (DoTT&S). A member of construction staff (flagman) will be present at key junctions during peak delivery times. 		
MM48	Delivery of abnormally sized loads	EIAR Chapter 5 and Chapter 15, CEMP Section 4	<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 153 abnormal sized loads will be delivered to the site, comprising 31 convoys of 5, undertaken over 31 separate nights. 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ➤ These nights will be spread out over an approximate period of 9 weeks and will be agreed in advance with the relevant authorities ➤ In order to manage each of the travelling convoys, for each convoy there will be two Garda escort vehicles that will stop traffic at the front and rear of the convoy of 5 vehicles. ➤ There will also be two escort vehicles provided by the haulage company for each convoy ➤ Implementation of temporary alterations to road network at critical junctions – at locations highlighted in section 15.1.8. ➤ In addition, in order to minimise the impact on the existing environment during turbine component deliveries the option of blade adaptor trailers will also be used where deemed practicable. 		
<i>Cultural Heritage</i>					
MM49	Felling Licence	EIAR Chapter 4	<ul style="list-style-type: none"> ➤ Felling will be carried out under the terms of a licence application to the Forest Service, as per the Forest Service’s policy on granting felling licenses for wind farm developments 		
MM50	Clear felling of Coniferous Plantation	EIAR Chapter 4	<ul style="list-style-type: none"> ➤ Works will be overseen by an ECoW. ➤ The extent of all necessary tree felling will be identified and demarcated with markings on the ground in advance of any felling commencing. ➤ All roads and culverts will be inspected prior to any machinery being brought on site to commence the felling operation. No tracking of vehicles through watercourses will occur. Vehicles will only use existing road infrastructure and established watercourse crossings. ➤ Existing drains that drain an area to be felled towards surface watercourses will be blocked, and temporary silt traps will be constructed to ensure collection of all silt within felling areas. These 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<p>temporary silt traps will be cleaned out and backfilled once felling works are complete. This ensures there is no residual collected silt remaining in blocked drains after felling works are completed. No direct discharge of such drains to watercourses will occur from within felling areas.</p> <ul style="list-style-type: none"> ➤ New collector drains and sediment traps will be installed during ground preparation to intercept water upgradient of felling areas and divert it away. Collector drains will be excavated at an acute angle to the contour (0.3%-3% gradient), to minimise flow velocities. ➤ All silt traps will be sited outside of buffer zones and have no direct outflow into the aquatic zone. Machine access will be maintained to enable the accumulated sediment to be excavated. Sediment will be carefully disposed of away from all aquatic zones. ➤ All new collector drains will taper out before entering the aquatic buffer zone to ensures the discharging water gently fans out over the buffer zone before entering the aquatic zone. ➤ Machine combinations will be chosen which are most suitable for ground conditions at the time of felling, and which will minimise soils disturbance; ➤ Mechanised operations will be suspended during and immediately after heavy rainfall. ➤ Where brash is required to form brash mats, it is to be laid out at harvesting stage to prevent soil disturbance by machine movement. ➤ Unused Brash may be moved within the site to facilitate the creation of mats in more demanding locations. ➤ Felling of trees will be pointed directionally away from watercourses. ➤ Felling will be planned to minimise the number of machine passes in any one area. ➤ Extraction routes, and hence brash mats, will be aligned parallel to the ground contours where possible. 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ➤ Harvested timber will be stacked in dry areas, and outside any 50-metre watercourse buffer zone. Straw bales and check dams to be emplaced on the down gradient side of timber storage sites. ➤ Branches, logs or debris will not be allowed to build up in aquatic zones. All such material will be removed when harvesting operations have been completed but removing of natural debris deflectors will be avoided 		
Operational Phase					
<i>Population & Human Health</i>					
MM51	Health & Safety	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. ➤ 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 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 intervals and change of cable route direction; ○ Directions to relevant turbines at junctions; ○ “No access to Unauthorised Personnel” at appropriate locations; 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ○ Speed limits signs at site entrance and junctions; ○ “Warning these Premises are alarmed” at appropriate locations; ○ “Danger HV” at appropriate locations; ○ “Warning – Keep clear of structures during electrical storms, high winds or ice conditions” at site entrance; ○ “No unauthorised vehicles beyond this point” at specific site entrances; and ○ Other operational signage required as per site-specific hazards. 		
MM52	Health & Safety	EIAR Chapter 5	<ul style="list-style-type: none"> ➤ An operational phase Health and Safety Plan will be developed to fully address identified Health and Safety issues associated with the operation of the site and providing for access for emergency services at all times. ➤ The components of a wind turbine are designed to last up to 30 years (or longer with regular maintenance) and are equipped with a number of safety devices to ensure safe operation during their lifetime. During the operation of the wind farm regular maintenance of the turbines will be carried out by the turbine manufacturer or appointed service company. A project or task specific Health and Safety Plan will be developed for these works in accordance with the site’s health and safety requirements. 		
Shadow Flicker					
MM53	Shadow Flicker monitoring & Screening	EIAR Chapter 6	In the event that shadow flicker limit exceedances are experienced at buildings, a site visit will be undertaken firstly to determine the level of occurrence, existing screening and window orientation. The shadow flicker prediction data will be used to select dates on which a shadow flicker event could be observed at one or multiple affected properties and the following process will be adhered:		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ➤ Recording the weather conditions at the time of the site visit, including wind speeds and direction (i.e. blue sky, intermittent clouds, overcast, moderate breeze, light breeze, still etc.). ➤ Recording the house number, time and duration of site visit and the observation point GPS coordinates. ➤ Recording the nature of the sensitive receptor, its orientation, windows, landscaping in the vicinity, any elements of the built environment in the vicinity, vegetation. ➤ In the event of shadow flicker being noted as occurring the details of the duration (times) of the occurrence will be recorded. ➤ Screening Measures: In the event of an occurrence of shadow flicker exceeding guideline threshold values of 30 hours per annum or 30 minutes per day at residential receptor locations, mitigation options will be discussed with the affected homeowner, including: <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. 		
MM54	Turbine Control Measures		<p>If it is not possible to mitigate identified shadow flicker limit exceedances locally using the measures detailed in MM53, the following turbine shut-down/curtailment procedure shall be incorporated as a mitigation measure within the operating system of the permitted wind farm:</p> <ul style="list-style-type: none"> ➤ The SCADA (Supervisory Control and Data Acquisition) wind turbine control system for the permitted development will be programmed to cease operation of the relevant wind turbine(s) where shadow flicker 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<p>exceeds the allowed 30 minutes per day/30 hours annual limit at any identified sensitive receptor. The turbine technology includes a photocell which records light levels and whether they are strong enough to cast a shadow and as such turbines can be programmed to shut down in the event of the specified threshold values – 30 hours per annum or 30 minutes per day) being reached. This action would be taken when the particular weather conditions relating to a potential Shadow Flicker exceedance limits event occurs, i.e. a particular wind speed, direction and direct sunlight present.</p> <ul style="list-style-type: none"> ➤ Within 12 months of commissioning of the wind farm, field investigation/monitoring will be carried out by the wind farm operator at potentially affected properties in order to confirm the effectiveness of the mitigation measures. ➤ 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 will be invited to engage with the Wind Farm Developer. ➤ The homeowner will be asked to log the date, time and duration of shadow flicker events occurring on at least five different days. This methodology has been used effectively at other sites. 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. A report on the effectiveness of the shadow flicker mitigation measures will be compiled and submitted to the local authority in line with the current best practice. 		
Biodiversity					
MM55	Bats	EIAR Chapter 7	<ul style="list-style-type: none"> ➤ 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 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<p>blade and any trees or other tall vegetation that could provide high quality foraging habitat for bat species, will be implemented.</p> <ul style="list-style-type: none"> ➤ Ongoing monitoring of bat activity will be undertaken for at least 3 years’ post construction of the wind farm. This will provide data and information on the actual recorded impact of the wind turbines on the local bat populations. Full details of the proposed monitoring programme are provided in Appendix 7.2, and includes measurement of bat activity, weather conditions and any correlation between the two. The monitoring will also include corpse searching in the areas surrounding the turbines to gather data on any actual collisions. ➤ If, following monitoring, there are significant effects recorded, a range of measures are proposed to ensure that any such effects are fully mitigated. These measures include blade feathering, curtailment of turbines during certain conditions and increase of buffers surrounding the turbines. Any or all of the above measures may be employed following actual monitoring of the impact of the operating turbines on bats to ensure that no potential for significant effects on bat species remains 		
Traffic Management					
MM56	Roads	EIAR Chapter 15	<ul style="list-style-type: none"> ➤ Post Construction Condition Survey – Where required by the local authority, 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 		
MM57	Telecommunications	EIAR Chapter 15	<ul style="list-style-type: none"> ➤ In the event of interference occurring to telecommunications, the Department of the Environment, Heritage and Local Government 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<p>‘Wind Farm Planning Guidelines’ (2006) acknowledge that ‘electromagnetic interference can be overcome’ by the use of divertor relay links out of line with the wind farm.</p>		
MM58	Telecommunication-Aviation	EIAR Chapter 15	<ul style="list-style-type: none"> ➤ The Irish Aviation Authority (IAA) requested the following which will be agreed with and implemented during the operational period of the wind farm. ➤ Agree an aeronautical obstacle warning light scheme for the wind farm development. ➤ Provide as-constructed coordinates in WGS84 format together with ground and tip height elevations at each wind turbine location. ➤ Notify the Authority of intention to commence crane operations with a minimum of 30 days prior notification of their erection 		
Ornithology					
MM59	Bird monitoring programmes	EIAR Chapter 8	<p>In line with best practise measures, a detailed post-construction Bird Monitoring Programme has been prepared for the operational phase of the Proposed Development, please refer to Appendix 8-7 for further details. The programme of works will monitor parameters associated with collision, displacement/barrier effects and habituation during the lifetime of the project. Surveys are proposed to be scheduled to coincide with Years 1, 2, 3, 5, 10 & 15 of the lifetime of the wind farm. Monitoring measures are based on guidelines issued by the Scottish Natural Heritage (SNH, 2009). The following individual components are proposed:</p> <ul style="list-style-type: none"> ➤ Flight activity surveys: vantage point surveys ➤ Targeted bird collision surveys (corpse searches) will be undertaken with trained dogs. The surveys will include detection and scavenger 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<p>trials, to correct for these two biases and ensure the resulting data is robust.</p>		
<i>Peat, Subsoils and Bedrock</i>					
MM60	Site Road Maintenance and Vehicle Use	EIAR Chapter 9	<ul style="list-style-type: none"> ➤ Use of aggregate from authorised quarries for use in road and hardstand maintenance. ➤ Vehicles used during the operational phase will be refuelled off site before entering the site; ➤ No fuels will be stored on-site during the operational phase; and ➤ Spill kits will be available in all site vehicles to deal with an accidental spillage and breakdowns; and, ➤ An emergency plan for the operational phase to deal with accidental spillages and breakdowns will be contained in the Environmental Management Plan for the wind farm operational phase. The plan will include access to spill kits, containment bins and absorbent material. 		
MM61	Use of Oils in Turbine Transformers During Operational Stage	EIAR Chapter 9	<ul style="list-style-type: none"> ➤ All transformers and substation areas will be bunded to 110% of the volume of oil used in each transformer/substation; 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ➤ An emergency plan for the operational phase to deal with accidental spillages will be contained in the Environmental Management Plan for the wind farm operational phase. The plan will include access to spill kits, containment bins and absorbent material. 		
Drainage Management Plan					
MM62	Progressive Replacement of Natural Surface with Lower Permeability Surfaces	EIAR Chapter 10 CEMP Section 5	<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 over the ground by means of a level spreader; ➤ Swales/collector road side (dirty water) drains will be used to collect runoff from access roads and turbine hardstanding areas of the site, likely to have entrained suspended sediment, and channel it to settlement ponds for sediment settling; ➤ On steep sections of access road transverse drains (‘grips’) will be constructed in the surface layer of the road to divert any runoff off the road into swales/road side drains; ➤ Check dams will be used along sections of access road drains to intercept silts at source. Check dams will be constructed from a 4/40mm non-friable crushed rock; ➤ Settlement ponds, emplaced downstream of road swale sections and at turbine locations, will buffer volumes of runoff discharging from the drainage system during periods of high rainfall, by retaining water until the storm hydrograph has receded, thus reducing the hydraulic loading to watercourses; and, ➤ Settlement ponds will be designed in consideration of the greenfield runoff rate. 		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
MM63	Runoff Resulting in Suspended Solids Entrainment in Surface Waters	EIAR Chapter 10 CEMP Section 5	➤ Please see MM10 and MM20		
MM64	Control of hydrocarbons during maintenance	EIAR Chapter 10 CEMP Section 5	➤ Please see MM18		
Noise & Vibration					
MM65	Greenhouse Gas Emissions	EIAR Chapter 11	<ul style="list-style-type: none"> ➤ All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise. ➤ Turbines and construction materials will be transported to the site on specified routes only unless otherwise agreed with the Planning Authority. ➤ The majority of aggregate materials for the construction of the proposed wind farm will be obtained from the three proposed borrow pits on the site of the Proposed Development. This will significantly reduce the number of delivery vehicles accessing the site, thereby reducing the amount of emissions associated with vehicle movements. 		
Air Quality/Dust					
MM66	Exhaust Emissions	EIAR Chapter 11	➤ Any vehicles or plant brought onsite during the operational phase will be maintained in good operational order that comply with the Road Traffic Acts 1961 as amended, thereby minimising any emissions that arise.		

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
Decommissioning Phase					
<i>Ornithology</i>					
MM67	Disturbance/Displacement	EIAR Chapter 8	➤ Mitigation measures outlined for the Construction phase remain the same for the decommissioning phase.		
<i>Biodiversity</i>					
MM68	Impact on Flora, Fauna and Aquatic Species	EIAR Chapter 7	➤ 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. A decommissioning plan is contained in the CEMP, Appendix 4-4 of this EIAR.		
<i>Air Quality/dust</i>					
MM69	Exhaust, Dust and Greenhouse Gas Emissions	EIAR Chapter 11	➤ The mitigation measures prescribed for the construction phase of the proposed development will be implemented during the decommissioning phase thereby minimising any potential impacts.		
<i>Noise & Vibration</i>					
MM70	Noise & Vibration	EIAR Chapter 13	➤ Mitigation measures considered in relation to any decommissioning of the site are the same as those proposed for the construction phase of the development.		
<i>Traffic & Transport</i>					

Reference No:	Reference Heading	Location	Mitigation Measure	Audit Result	Action Required
MM71	Traffic & Transport	EIAR Chapter 15	<ul style="list-style-type: none"> ➤ A decommissioning plan, including material recycling / disposal and traffic management plan will be prepared for agreement with the local authority. This plan will contain similar mitigation measures to those implemented during the construction phase. 		

17.3

EIAR Monitoring Measures

Table 17-2 Monitoring Schedule Lyrenacarriga Wind Farm

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
Pre-Commencement Phase						
MX1	Environmental Management	EIAR Chapter 4 CEMP Section 4	<ul style="list-style-type: none"> ➤ The Contractor will be responsible for implementing the monitoring measures specified throughout the EIAR and compiled in the Audit Report which is included in the CEMP. ➤ The Contractor will also be responsible for ensuring that all construction staff understand the importance of implementing the monitoring measures. The implementation of the monitoring measures will be overseen by the Environmental Clerk of Works (ECoW) or supervising hydrogeologists, environmental scientists, ecologists or geotechnical engineers, depending on who is best placed to advise on the implementation. The system of auditing referred to above ensures that the monitoring measures are maintained for the duration of the construction phase, and into the operational phase where necessary. 	Ongoing	Monthly	ECoW
MX2	Environmental Management	EIAR Chapter 4 CEMP Section 4	<ul style="list-style-type: none"> ➤ The ECoW will oversee the site works and implementation of the Construction Environmental Management Plan (CEMP), and provide on-site advice on the mitigation measures necessary as necessary to ensure the project proceeds as intended. The level, detail and frequency of reporting expected from the Site ECoW for the Construction Manager, developer’s project manager, and any Authorities or other Agencies, will be agreed by parties where required prior to commencement of 	Ongoing	Monthly	ECoW

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			construction, and may be further adjusted as required during the course of the project.			
MX3	Drainage Maintenance	EIAR Chapter 4, Chapter 10, CEMP Section 5	<ul style="list-style-type: none"> ➤ An inspection and maintenance plan for the drainage system on site will be prepared in advance of commencement of any works. Regular inspections of all installed drainage systems will be necessary, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water at parts of the systems where it is not intended. The inspection of the drainage system will be the responsibility of the site ECoW or the supervising hydrologist. 	Ongoing	Monthly	ECoW
MX4	Environmental Management	EIAR Chapter 4 CEMP Section 4	<p>Before the commencement of any felling works, the ECoW</p> <ul style="list-style-type: none"> ➤ will oversee the keyhole and extraction works. ➤ Attend the site for the setup period when drainage protection works are being installed and be present on site during the remainder of the forestry keyhole felling works. Prior to the commencement of construction works, the ECoW will ➤ 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). During Construction works the ECoW will ➤ 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 	Ongoing	Monthly	ECoW

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			<p>accordance with Section 3.4 (Monitoring and Recording) and Appendix 3 (Site Monitoring Form (Visual Inspections)) of the <i>Forestry & Freshwater Pearl Mussel Requirements</i>.</p> <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"> ○ Surface water samples shall be collected upstream and downstream of the keyhole felling site at suitable sampling locations. ○ Sampling shall be taken from the stream / riverbank, with no in-stream access permitted. ○ The following minimum analytical suite shall be used: pH, Electrical Conductivity, Total Suspended Solids, Biochemical Oxygen Demand, Total Phosphorus, Ortho-Phosphate, Total Nitrogen, and Ammonia. ➤ Review of operator’s records for plant inspections, evidence of contamination and leaks, and drainage checks made after extreme weather conditions. ➤ Prepare and maintain a contingency plan. ➤ Suspend work where potential risk to water from siltation and pollution is identified, or where operational methods and mitigation measures are not specified or agreed. ➤ Prepare and maintain a Water Protection Measure Register. This document is to be updated weekly by the ECoW. 			
MX5	Adaptive Site Drainage Management	EIAR Chapter 4, Chapter 10, CEMP Section 5	<ul style="list-style-type: none"> ➤ The final drainage design prepared for the Proposed Development prior to commencement of construction will provide for reactive/ adaptive management of drainage measures. 	Ongoing	Monthly	Project Hydrologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			<ul style="list-style-type: none"> The effectiveness of drainage measures designed to minimise runoff entering works areas and capture and treat silt-laden water from the works areas, will be monitored continuously by the ECoW or supervising hydrologist on-site. 			
MX6	Site Drainage Plan	EIAR Chapter 4, Chapter 10, CEMP Section 5	<ul style="list-style-type: none"> The Project Hydrologist/Design Engineer will assist in preparing a site drainage plan before construction commences. 	As Required	As Required	Project Hydrologist /Design Engineer
MX7	Invasive Species	EIAR Chapter 7 CEMP Section 4	<ul style="list-style-type: none"> A pre-commencement invasive species survey shall be completed for the site. Rhododendron will be clearly marked using posts and tape prior to any machinery/personnel entering the site (this includes site investigation, clearance, fencing or set up works). All fencing will be monitored and maintained for the duration of the works. This will be supervised by the Project Ecologist 	Once	On completion	Project Ecologist
MX8	Ornithology: Pre-Construction Monitoring	EIAR Chapter 8	<ul style="list-style-type: none"> Pre-commencement surveys will be undertaken prior to the initiation of works at the wind farm. The verification survey will include a thorough walkover survey to a 500m radius of the development footprint and/or all works areas, where access allows. If winter roost sites 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 season or breeding season (respectively) of the construction phase. If it is found to be active during the construction phase no works shall be undertaken within a 500m buffer (Forestry Commission Scotland, 2006; Ruddock & Whitfield, 2007) in line with best practise. No works shall be 	Once	On completion	Project Ecologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			<p>permitted within the buffer until it can be demonstrated that the roost or nest is no longer occupied.</p> <ul style="list-style-type: none"> ➤ All site staff and subcontractors will be made aware of any restrictions to be imposed by means of a toolbox talk and a map of the ‘no-work zone’ will be made available to all construction staff. The restricted area will also be marked off using hazard-tape fencing to alert all personnel on site to the suspension of works within that area. ➤ Where no roosting, nesting or breeding activity of species of high conservation concern is identified in works areas, construction activity can proceed, with ongoing monitoring in parallel to ensure adherence of protection protocols throughout the season. 			
MX9	Archaeology and Cultural Heritage	Chapter 14	<ul style="list-style-type: none"> ➤ Protective buffer zones will be implemented around the recorded monuments listed in Table 14-3 prior to the commencement of the construction phase. All onsite staff will receive toolbox talks on these buffer zones which will be maintained throughout the construction period. ➤ Pre-development licensed archaeological testing of the following: <ul style="list-style-type: none"> ○ Proposed cable route in greenfield areas ○ Turbines/Hardstands for T3, T4, T6, T7, T14, T16 and T17 ○ New roads where they are proposed in green fields ○ Proposed new road along haul route ➤ Archaeological monitoring (under licence from the National Monuments Service) of any further geotechnical / engineering trial pits or investigations and a report detailing the results of same. 	Ongoing	Monthly	Project Archaeologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			<ul style="list-style-type: none"> ➤ A licensed metal detection survey of the watercourse prior to the cable route excavation in this location. This could be undertaken by the monitoring archaeologist on site in advance of the works as part of the overall monitoring programme. ➤ A photographic and descriptive record of the boundary removal that is proposed at the Historic Settlement north of T16. This will be undertaken by the monitoring archaeologist in advance of groundworks associated with T16. 			
MX10	Traffic Management Plan, Delivery Programme, pre-commencement road works	EIAR Chapter 15, CEMP Section 4	<p>A Traffic Management Plan (TMP) is provided specifying details relating to traffic management is included in the CEMP (Appendix 4-4). Prior to the commencement of the construction phase of the proposed development a final Traffic Management Plan, incorporating all the mitigation measures set out in the TMP will be prepared by the Contractor for agreement with the local authority and An Garda Síochána. The TMP includes recommendations for 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 project and this person will be the main point of contact for all matters relating to traffic management. ➤ Delivery Programme – a programme of deliveries will be submitted to the County Councils in advance of deliveries of turbine components to site. Liaison with the relevant local authorities and Transport Infrastructure Ireland (TII) 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 site. 	Once and updated as required	As Required	Site Manager

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			<ul style="list-style-type: none"> ➤ A Pre and Post Construction Condition Survey – Where required by the local authority, a pre-condition survey of roads associated with the proposed development can be carried out immediately prior to construction commencement to verify and record the 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 the County Councils 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), the Roads section 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 15.1.8. In addition, in order to minimise the impact on the existing environment during turbine component deliveries the option of blade adaptor trailers will also be used where deemed practicable. ➤ Identification of delivery routes – These routes will be agreed with the County Councils and adhered to by all contractors. ➤ Delivery times of large turbine components - The management plan will include the option to deliver the large wind turbine 			

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			<p>plant components at night in order to minimise disruption to general traffic during the construction stage.</p> <ul style="list-style-type: none"> ➤ 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, ➤ 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 4.3. <p>Re-instatement works - All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers.</p>			
MX11	Information to Local Residents	EIAR Chapter 15	<ul style="list-style-type: none"> ➤ Locals in the area will be informed of any upcoming traffic related matters e.g. temporary lane/road closures (where required) or delivery of turbine components at night, via letter drops and posters in public places. Information will include the contact details of the Site Manager, 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. The Site Community Liaison Officer (one has been in place since June 2018) will also be liaising with all local residents and near neighbours. 	As Required	As Required	Site Manager & Community Liaison Officer
Construction Phase						
MX12	Health and Safety	EIAR Chapter 5	The PSCS appointed for the construction stage shall be required to perform his/her duties as prescribed in the Safety, Health and	Ongoing	Monthly & As required	Site Manager / PSCS

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			<p>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; ➤ 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; ➤ Notify the Authority and the client of non-compliance with any written directions issued. 			
MX13	Plant and Equipment Inspections	EIAR Chapter 4, Chapter 8.	<ul style="list-style-type: none"> ➤ A programme for the regular inspection of plant and equipment for leaks and fitness for purpose will be developed at the outset of the construction phase. 	Before Use	As Necessary	Drivers / ECoW

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			<ul style="list-style-type: none"> ➤ The plant used will be regularly inspected for fuel leaks, unnecessary noise generation and general fitness for purpose. ➤ Local areas of the haul route will be condition monitored and maintained, if necessary. 			
MX14	Flora and Fauna	EIAR Chapter 7	<ul style="list-style-type: none"> ➤ Habitat condition monitoring will be undertaken during construction and in year 1 post construction to ensure that there are no negative effects on marsh fritillary habitat 	As required	Monthly	Project Ecologist
MX15	Flora and Fauna	CEMP Section 5	<ul style="list-style-type: none"> ➤ The Project Ecologist will carry out regular inspection and monitoring of the development, through all phases of construction/operation and provide ecological advice as required and carry out ecological monitoring and survey work as may be required by the planning authority 	As required	Monthly	Project Ecologist
MX16	Breeding Bird Disturbance	EIAR Chapter 8	<ul style="list-style-type: none"> ➤ A Project Ecologist who will fulfil the role of Ecological Clerk of Works will be appointed. Duties will include: <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 Proposed Development site. ○ Oversee management of ornithological and ecological issues during the construction period and advise on ornithological issues as they arise. ○ Provide guidance to contractors to ensure legal compliance with respect to protected species onsite. 	As required	Monthly	Project Ecologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			Liaise with officers of consenting authorities and other relevant bodies with regular updates in relation to construction progress.			
MX17	Breeding Birds	EIAR Chapter 8	<ul style="list-style-type: none"> In the interest of the protection of breeding birds, should the planned construction programme commencement coincide with the Breeding bird season (April to July inclusive), an early breeding season survey by a qualified ornithologist will be commissioned and, subject to confirmation of no nesting or breeding activity in any areas for works to be undertaken, works will proceed, with ongoing monitoring in parallel to ensure adherence of protection protocols throughout the season. Hedgerow cutting and disturbance of any other confirmed nesting habitat would be prohibited during the breeding season in line with legislation and best practice. The removal of woody vegetation will be undertaken in full compliance with Section 40 of the Wildlife Act 1976 – 2018. Any required removal of vegetation will be undertaken following inspection by a suitable qualified ornithologist to ensure no nesting birds are affected. 	As required during the breeding season	Monthly	Project Ornithologist
MX18	Water Quality and Monitoring	EIAR Chapter 10 CEMP Section 5	<ul style="list-style-type: none"> The effectiveness of drainage measures designed to minimise runoff entering works areas and capture and treat silt-laden water from the works areas, will be monitored continuously by the Environmental Clerk of Works (ECoW) on-site. The ECoW or supervising hydrologist will respond to changing weather, ground or drainage conditions on the ground as the project proceeds, to ensure the effectiveness of the drainage design is maintained in so far as is possible. 	As Required	As Necessary	ECoW / Project Hydrologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
MX19	Water Quality and Monitoring	EIAR Chapter 10 CEMP Section 5	<ul style="list-style-type: none"> Daily surface water monitoring forms will be utilised at every works site near any watercourse. These will be taken daily and kept on site for record and inspection. 	Daily	As Necessary	ECoW
MX20	Surface Water Quality	EIAR Chapter 4, CEMP Section 5	<ul style="list-style-type: none"> Baseline laboratory analysis of a range of parameters with relevant regulatory limits and EQSs will be undertaken as per water monitoring programme for the overall windfarm development and each primary watercourse along the route. This will not be restricted to just these locations around the immediate wind farm site with further sampling points added as deemed necessary by the Environmental Clerk of Works in consultation with the Project Hydrologist and Site Manager. In-situ field monitoring will be completed on a Monthly basis. In-situ field monitoring will also be completed after major rainfall events, i.e. after events of >25mm rainfall in any 24-hour period. The supervising hydrologist will monitor and advise on the readings collected by in-situ field monitoring. 	Monthly	As received	ECoW
MX21	Drain Inspection and Maintenance	EIAR Chapter 4 Chapter 10	<p>The following items shall be carried out during pre-felling inspections and after:</p> <ul style="list-style-type: none"> Communication with tree felling operatives in advance to determine whether any areas have been reported where there is unusual water logging or bogging of machines; Inspection of all areas reported as having unusual ground conditions; Inspection of main drainage ditches and outfalls. During pre-felling inspections, the main drainage ditches shall be identified. 	As Required	As Necessary	ECoW / Project Hydrologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			Ideally the pre-felling inspection shall be carried out during rainfall			
MX22	Surface Water Quality Monitoring	EIAR Chapter 4, EIAR Chapter 10	<ul style="list-style-type: none"> ➤ Daily monitoring of excavations by a suitably qualified person will occur during the construction phase ➤ Daily inspections will be undertaken to assess the effectiveness of the water treatment train 	Daily	As Required	ECoW
MX23	Deterioration of Water Quality	EIAR Chapter 4, NIS.	<ul style="list-style-type: none"> ➤ Daily monitoring of excavations by a suitably qualified person will occur during the construction phase. If high levels of seepage inflow occur, excavation work will be immediately be stopped, and a geotechnical assessment undertaken. ➤ Turbidity monitors or sondes will be installed at locations surrounding the wind farm site. The monitoring locations will be selected as part of the final drainage design before construction commences in consultation with the Project Hydrologist. ➤ The Project Hydrologist will advise on the optimum locations for continuous water monitoring. The sondes will provide continuous readings for turbidity levels in the watercourse. This equipment will be supplemented by daily visual monitoring (during the construction phase) at their locations. ➤ All such measures will be overseen and implemented by a dedicated project Environmental Clerk of Works. 	Daily	As Required	ECoW
MX24	Silt Fences	EIAR Chapter 4, Chapter 10	Silt fences will be emplaced within drains down-gradient of all construction areas. Silt fences are effective at removing heavy settleable solids such as those present in the subsoils/sandstone tills that overlie the site. This will act to prevent entry to water courses of sand and gravel sized sediment, released from excavation of	Daily	As Required	ECoW

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			mineral sub-soils of glacial and glacio-fluvial origin, and entrained in surface water runoff. Inspection and maintenance of these structures during the construction phase is critical to their functioning to stated purpose. They will remain in place throughout the entire construction phase. Double silt fences will be placed within drains down-gradient of all construction areas inside the hydrological buffer zones.			
MX25	Clear felling of Coniferous Plantation	EIAR Chapter 10 CEMP Section 4	<ul style="list-style-type: none"> ➤ Works will be overseen by an ECoW. ➤ The extent of all necessary tree felling will be identified and demarcated with markings on the ground in advance of any felling commencing. ➤ All roads and culverts will be inspected prior to any machinery being brought on site to commence the felling operation. No tracking of vehicles through watercourses will occur. Vehicles will only use existing road infrastructure and established watercourse crossings 	Daily	As Required	ECoW
MX26	Plant and Equipment Inspections	EIAR Chapter 10 CEMP Section 4	The plant used will be regularly inspected for fuel leaks, unnecessary noise generation and general fitness for purpose. Local areas of the haul route will be condition monitored and maintained, if necessary.	Daily	As Required	ECoW/Site Manager
MX27	Noise and Vibration	EIAR Chapter 13	Monitoring typical levels of noise and vibration during critical periods and at sensitive locations will be carried out.	Ongoing	As Required	ECoW/Site Manager
MX28	Cultural Heritage	EIAR Chapter 14	<ul style="list-style-type: none"> ➤ Archaeological monitoring of ground works during construction (in areas of previously undisturbed ground). The National Monuments Service will be informed of such findings to discuss how best to proceed. If archaeological finds, features 	Ongoing	As Required	Project Archaeologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			<p>or deposits are uncovered during archaeological monitoring, the developer will be prepared to provide resources for the resolution of such features whether by preservation by record (excavation) or preservation in situ (avoidance). Once the project is completed, a report on the results of the monitoring will be compiled and submitted to the relevant authorities.</p> <ul style="list-style-type: none"> ➤ Archaeological monitoring (under licence from the National Monuments Service) of any further geotechnical / engineering trial pits or investigations and a report detailing the results of same. ➤ Preservation of Townland boundaries: A photographic and descriptive record of any boundaries that are proposed to be removed during construction. This will be undertaken by the monitoring archaeologist. ➤ Archaeological monitoring of topsoil/peat removal of all off-road sections of the proposed route during construction. A report on the results of the monitoring shall be compiled and submitted to the relevant authorities on completion of the project. ➤ Archaeological Monitoring along the public road where it crosses the bridge at Breeda townland. A photographic and descriptive record of the bridge arches will be made (if exposed) and a report compiled on the findings. 			
MX29	Traffic Management Co-Ordinator	EIAR Chapter 15 CEMP Section 4	<ul style="list-style-type: none"> ➤ A competent Traffic Management Coordinator will be appointed for the duration of the project and this person will be the main point of contact for all matters relating to traffic management. 	Ongoing	As Required	Site Manager
Operational Phase						

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
MX30	Health & Safety	EIAR Chapter 5	<ul style="list-style-type: none"> ➤ An operational phase Health and Safety Plan will be developed to fully address identified Health and Safety issues associated with the operation of the site and providing for access for emergency services at all times. ➤ Turbines have a direct communications link with remote monitoring centres (both in Eirgrid and the Turbine Manufacturer). Faults signals from sensors are communicated to, and managed by, these monitoring centres and alerts can be raised to appointed Operation and Maintenance crews who can assess and address any issues in advance of or as they arise. 	Ongoing	As Required	Site Manager
MX31	Flora and Fauna	EAIR Section 6	<ul style="list-style-type: none"> ➤ Habitat condition monitoring will be undertaken during construction and in year 1 post construction to ensure that there are no negative effects on marsh fritillary habitat 	Ongoing	As Required	Project Ecologist
MX32	Bird monitoring programmes	EIAR Chapter 8	<p>In line with best practise measures, a detailed post-construction Bird Monitoring Programme has been prepared for the operational phase of the Proposed Development, please refer to Appendix 8-7 for further details. The programme of works will monitor parameters associated with collision, displacement/barrier effects and habituation during the lifetime of the project. Surveys are proposed to be scheduled to coincide with Years 1, 2, 3, 5, 10 & 15 of the lifetime of the wind farm. Monitoring measures are based on guidelines issued by the Scottish Natural Heritage (SNH, 2009). The following individual components are proposed:</p> <ul style="list-style-type: none"> ➤ Flight activity surveys: vantage point surveys ➤ Targeted bird collision surveys (corpse searches) will be undertaken with trained dogs. The surveys will include 	Ongoing	As Required	Project Ornithologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			detection and scavenger trials, to correct for these two biases and ensure the resulting data is robust.			
MX33	Noise Monitoring	EIAR Chapter 13	<ul style="list-style-type: none"> ➤ One post commissioning noise monitoring survey is recommended to ensure compliance with any noise conditions applied to the development. In the unlikely instance that an exceedance of these noise criteria is identified, the assessment guidance outlined in the noise conditions, ESTU-R-97, IoA GPG and Supplementary Guidance Note 5: Post Completion Measurements (July 2014) will be followed and relevant corrective actions will be taken, if required. For example, implementation of noise operational modes resulting in curtailment of turbine operation can be implemented for specific turbines in specific wind conditions to ensure predicted noise levels are within the relevant planning conditions. ➤ In the unlikely event that an issue with low frequency noise is associated with the Proposed Development, it is recommended that an appropriate investigation be undertaken. Due consideration will be given to guidance on conducting such an investigation which is outlined in Appendix VI of the EPA document entitled <i>Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities</i> (NG4) (EPA, 2016). 	Once	On completion	Site Manager
MM34	Surface Water Quality	CEMP Section 4	<ul style="list-style-type: none"> ➤ Monthly sampling for laboratory analysis for a range of parameters adopted during pre-commencement and construction phases will continue for six months during the operational phase. The supervising hydrologist will monitor and advise on the readings being received from the testing laboratory. 	Ongoing	Monthly	ECoW

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
MX35	Drainage Inspections	CEMP Section 5	<p>➤ 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.</p>	Ongoing	Monthly	ECoW