

Environmental Impact Assessment Report (EIAR)

Slievegrine Renewable
Energy Development, Co.
Waterford

Chapter 18 – Schedule of Mitigation and
Monitoring Measures



18.

SCHEDULE OF MITIGATION & MONITORING MEASURES

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

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

- > Pre-Construction Phase
- > Construction Phase
- > Operational Phase
- > Decommissioning Phase

The below format provides an easy to audit list of mitigation measures that can be reviewed and reported on during each phase of the Proposed Project. The proposals for site inspections and environmental audits are set out in the Construction and Environmental Management Plan (CEMP) which is included as Appendix 4-3 of this EIAR. The tabular format in which the below information is presented, can be further expanded upon during each Proposed Project phase to provide a reporting template for site compliance audits.

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

It is intended that the CEMP will be updated where required prior to the commencement of construction to include all mitigation and monitoring measures, planning conditions and or 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 prior to the commencement of development.

18.1

EIAR Mitigation Measures

Table 18-1 Schedule of Mitigation

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

			> Safety, Health and Welfare at Work (General Application) (Amendment) Regulations 2016 (S.I. No. 36 of 2016); > S.I. No. 528/2021 - Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021; and, > Safety, Health and Welfare at Work (Work at Height) Regulations 2006 (S.I. No. 318 of 2006). A Health and Safety Plan covering all aspects of the construction process will address the Health and Safety requirements in detail. This will be prepared on a preliminary basis at the procurement stage and developed further at construction stage. > All hazards will be identified, and risks assessed. Where elimination of the risk is not feasible, appropriate mitigation and/or control measures will be established. The contractor will be obliged under the construction contract and current health and safety legislation to adequately provide for all hazards and risks associated with the construction phase of the project. Safepass registration cards are required for all construction, delivery and security staff. Construction operatives will hold a valid Construction Skills Certificate Scheme card where required. The developer is required to ensure a competent contractor is appointed to carry out the construction works. The contractor will be responsible for the implementation of procedures outlined in the Safety and Health Plan. Public safety will be addressed by restricting Site access during construction. Fencing will be erected in areas of the Site where uncontrolled access is not permitted. > The suitability of machinery and equipment for use near power lines will be risk assessed. > All staff will be trained on operating voltages of overhead electricity lines running over the Site. All staff will be trained to be aware of the risks associated with overhead lines. All contractors that may visit the Site will be made aware of the location of overhead electricity lines before they come on to Site. > Barriers will run parallel to the overhead line at a minimum horizontal distance of 6 metres on plan from the nearest overhead line conductor wire. > When activities must be carried out beneath overhead lines, e.g., component delivery or substation construction, a Site-specific risk assessment will be undertaken prior to		
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			any works. The risk assessment must take into account the maximum potential height that can be reached by the plant or equipment that will be used prior to any works. Overhead line proximity detection equipment will be fitted to machinery when such works are required. > Information on safe clearances will be provided to all staff and visitors. > Signage indicating locations and health and safety measures regarding overhead lines > All staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021'. This will encompass the use of all necessary Personal Protective Equipment and adherence to Health and Safety Plan.		
MM03	Environmental Management	<i>Appendix 4-3</i>	The Project Developer will be required to engage a qualified Environmental Engineer, Environmental Scientist, Ecologist, or equivalent, with experience in wind farm construction to fulfil the role of Environmental Clerk of Works (ECoW) to oversee the construction works and audit the implementation of the CEMP. The ECoW will report to the Project Developer and Project Contractor but will liaise closely with the Construction Manager in relation to the Project Contractor's day-to-day implementation of the CEMP on site. The ECoW will have experience relating to freshwater pearl mussel will be appointed to the Site to oversee works in proximity to the River Licky. The level, detail and frequency of reporting expected from the ECoW for the Construction Manager, Developer's Project Manager, and any Authorities or other Agencies, will be agreed by all parties prior to commencement of construction, and may be further adjusted as required during the course of the Proposed Project.		
MM04	Waste Management	<i>Chapter 4: 'Description of the Proposed Project'</i>	Prior to the commencement of the development, a Construction Waste Manager will be appointed by the Contractor. The Construction Waste Manager will be in charge of the implementation of the objectives of the Waste Management Plan (WMP), ensuring that all hired waste contractors have the necessary permits/licenses and authorisations and that the waste management hierarchy is adhered to. The person nominated must have sufficient		

			authority so that they can ensure everyone working on the development adheres to the WMP. The WMP will provide systems that will enable all arisings, movements and treatments of construction waste to be recorded. This system will enable the contractor to measure and record the quantity of waste being generated. It will highlight the areas from which most waste occurs and allows the measurement of arisings against performance targets. The WMP can then be adapted with changes that are seen through record keeping.		
MM05	Site Drainage Plan	Appendix 4-4	The Project Hydrologist will complete a detailed drainage design and maintenance plan before construction commences and will attend the Site to set out the proposed drainage controls as outlined in Section 4.6.7 4.in Chapter 4: 'Description of the Proposed Project' of the EIAR. The drainage system will be excavated and constructed in conjunction with the road and hard standing construction. A network of drains already exist, and these will be integrated and enhanced as required and used within the Proposed Project drainage system. These existing drains will continue to function as they are during the pre-construction phase. Prior to commencement of works in sub-catchments across the Site, drain inspections will be completed to ensure ditches and streams are free from debris and blockages that may impede drainage. These inspections will be done on a catchment-by-catchment basis as the construction works develop across the Site, as works in all areas will not commence simultaneously.		
MM06	Pre-Construction Drainage	Chapter 4 Appendix 4-3 Appendix 4-4	Drainage and associated pollution control measures will be implemented onsite before the main construction works commence. Where possible drainage controls will be installed during seasonally dry ground conditions. This will reduce the possibility of impact on surface waters by suspended sediment released during construction and entrained in surface run-off. The routes of any natural drainage features will not be altered as part of the Proposed Project. Turbine locations have been selected to avoid natural watercourses. There will be		

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

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

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

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

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

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

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

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

			➤ On steeper slopes, silt fences, as detailed in MM23, will be installed temporarily downgradient of the cable trench works area, or on the downhill slope below where excavated material is being temporarily stored to control run-off.		
MM26	Reactive Site Drainage Management	Appendix 4-4:	➤ The final drainage design prepared for the Proposed Project prior to commencement of construction will provide for reactive management of drainage measures. ➤ The effectiveness of drainage measures designed to minimise runoff entering works areas and capture and treat silt-laden water from the works areas, will be monitored continuously by the ECoW or supervising hydrologist on-site. ➤ The ECoW or supervising hydrologist will respond to changing weather, ground or drainage conditions on the ground as the project proceeds, to ensure the effectiveness of the drainage design is maintained in so far as is possible. ➤ This may require the installation of additional check dams, interceptor drains or swales as deemed necessary on-site. ➤ The drainage design may have to be modified on the ground as necessary, and the modifications will draw on the various features set out in MM06–MM19 in whatever combinations are deemed to be most appropriate to situation on the ground as a particular time. ➤ In the event that works are giving rise to siltation of watercourses, the ECoW or supervising hydrologist will stop all works in the immediate area around where the siltation is evident. ➤ The source of the siltation will be identified and additional drainage measures such as those set out in MM06–MM19 will be installed in advance of works recommencing.		
MM27	Refuelling, Fuel, Spills, Leaks and Hazardous Materials Storage	Appendix 4-4:	Wherever possible, vehicles will be refuelled off-site, particularly for regular road-going vehicles. On-site refuelling of machinery will be carried out at designated refuelling areas at various locations throughout the Site heavy plant and machinery will be refuelled on-site by a fuel truck that will come to the Site as required on a scheduled and organised basis. Other refuelling will be carried out using mobile double skinned fuel bowser. The fuel bowser will be parked on a level area in the construction compound when not in use. All refuelling will be carried out outside designated watercourse buffer zones. Only designated trained and competent operatives will be authorised to refuel plant on-site.		

			Mobile measures such as drip trays and fuel absorbent mats will used during refuelling operations as required. All plant and machinery will be equipped with fuel absorbent material and pads to deal with any event of accidental spillage. The following mitigation measures are proposed to avoid release of hydrocarbons at the Site: > The highest standards of site management will be maintained, with the utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the Site and surrounding environment during construction; > An Emergency Response Plan for accidental spillages will be implemented as part of the CEMP. All construction staff will be familiar with the emergency procedures and the use of the relevant equipment; > The ECoW will oversee the pollution prevention measures agreed for the Site to ensure that they are operating safely and effectively as well as having responsibility for the implementation of Emergency Procedures for spill control measures. > Where possible, refuelling will occur at an off-site controlled fuelling station. > Refuelling will be undertaken by designated, suitably trained personnel only; > Refuelling of construction machinery will take place using drip trays at all times; > All plant and machinery will be serviced before being mobilised to site and will be regularly inspected and maintained to minimise the risk of leaks and spillages; > Maintenance of construction vehicles or plant will, where practicable, be undertaken off site; > Spill response kits will be available at all active work areas, refuelling locations, concrete works and construction compounds, and personnel will be trained in their use; > Fuels stored on-site will be minimised. Storage areas, where required, will be bunded appropriately for 110% of the fuel storage volume for the time period of construction and fitted with a storm drainage system and an appropriate oil interceptor; > All waste tar material arising from the excavation of the 110kV underground cabling trench and resurfacing of roads will be removed off-site and taken to a licenced waste facility;		
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			> An Emergency Response Plan for accidental spillages will be implemented as part of the CEMP. All construction staff will be familiar with the emergency procedures and the use of the relevant equipment; > Emergency Response PlanHydrocarbon interceptors will be installed at the substations and construction compounds where hydrocarbons are stored.		
MM28	Concrete Deliveries	<i>Appendix 4-4:</i>	> Only ready-mixed concrete will be used during the construction phase, with all concrete being delivered from local batching plants in concrete delivery trucks. The use of ready-mixed concrete deliveries will eliminate any potential environmental risks of on-site batching. > Before leaving the Site, washing of the delivery truck will be minimised and restricted to designated wash out areas. Wash out will be restricted to the concrete lorry's chute only. Concrete trucks will be washed out fully at the off-site batching plant, where facilities are already in place. > The small volume of water that will be generated from washing of the concrete lorry's chute will be directed into a temporary lined impermeable containment area, or equivalent. This type of water treatment unit catches the solid concrete and filters and holds wash liquid for pH adjustment and further solids separation. The residual liquids and solids will be removed off-site by an appropriately authorised waste collector for disposal at an authorised waste facility. Where temporary lined impermeable containment areas are used, such containment areas are typically built using straw bales and lined with an impermeable membrane. > The areas are covered when not in use to prevent rainwater collecting. In periods of dry weather, the areas can be uncovered to allow much of the water to be lost to evaporation. At the end of the concrete pours, any of the remaining liquid contents will be tankered off-site to an appropriately authorised facility as necessary. Any residual solid contents that will have been cleaned down from the chute will have solidified and can be broken up and disposed of along with other construction waste by an appropriately authorised waste collector for disposal at an authorised waste facility. > The risks of pollution arising from concrete deliveries will be further reduced by the following:		

			➤ Site roads will initially be constructed with a subgrade and compacted with the use of a roller to allow concrete delivery trucks access all areas where the concrete will be needed. The final wearing course for the Site roads will not be provided until all bases have been poured. ○ No concrete will be transported around the Site in open trailers or dumpers so as to avoid spillage while in transport. All concrete used in the construction of turbine foundations will be pumped directly into the shuttered formwork from the delivery truck. If this is not practical, the concrete will be pumped from the delivery truck into a hydraulic concrete pump or into the bucket of an excavator, which will transfer the concrete to the location where it is needed. ○ The arrangements for concrete deliveries to the Site will be discussed with suppliers before work starts, agreeing routes, prohibiting on-site washout and discussing emergency procedures. ○ Clearly visible signage will be placed in prominent locations close to concrete pour areas specifically stating washout of concrete lorries is not permitted at the Site.		
MM29	Concrete Pouring	<i>Appendix 4-4:</i>	Specific procedures will be adopted in advance of and during all concrete pours to minimise the risk of pollution. These will include: ➤ Using weather forecasting to assist in planning large concrete pours and avoiding large pours where prolonged periods of heavy rain is forecast. ➤ Restricting concrete pumps and machine buckets from slewing over watercourses (including drains and ditches) while placing concrete. ➤ Ensuring that excavations are sufficiently dewatered before concreting begins and that dewatering continues while concrete sets. ➤ Ensuring that covers are available, and used, when necessary, for freshly placed concrete to avoid the surface washing away in heavy rain. ➤ The small volume of water that will be generated from washing of the concrete lorry's chute will be directed into a temporary lined impermeable containment area, or equivalent.		

MM30	Public Road Cleanliness	<i>Appendix 4-4:</i>	➤ A road sweeper will be available if any section of the public roads requires cleaning due to construction traffic associated with the Proposed Project.		
MM31	Spoil Management Strategy and Placement of Spoil	<i>ELAR Chapter 4</i> <i>Appendix 4-3</i> <i>Appendix 4-4</i>	The following recommendations and best practice guidelines for the placement of spoil will be adhered to during the construction of the Proposed Project: ➤ The landscaping areas will be developed in a phased approach, with the spoil being removed and temporarily stockpiled while the borrow pits are extracted. The stockpiled spoil will be deposited into the void borrow pits upon completion of extraction activities and the exercise will continue within the void until it cannot accommodate any further spoil. ➤ Stockpiles of excavated spoil will not be placed within the stockpile exclusion area, as outlined in Figure 4-43 of Chapter 4 of the ELAR. ➤ The material will be backfilled into the void borrow pits and landscaping areas and will be spread evenly across the area. ➤ Stockpiles will be compacted to reduce air voids and reduce the migration paths for infiltration by precipitation. This will reduce the amount of potentially silt laden surface water run-off from these areas. ➤ Where practical, the surface of the placed spoil is shaped to allow efficient run-off of surface water. Where possible, shaping of the surface of the spoil will be carried out as placement of spoil within the area progresses. This will reduce the likelihood of debris run-off and ensure stability of the placed spoil. ➤ Inspections of the temporary stockpiles, reinstated borrow pits and landscaping areas will be made by a Geotechnical Engineer through regular monitoring of the works. The appointed contractor will review work practices at these areas when periods of heavy rainfall are expected so as to prevent excessive dirty water runoff from being generated. ➤ The surface of the deposited spoil will be profiled to a gradient to be agreed with the Geotechnical Engineer and vegetated or allowed to vegetate naturally as indicated by the Project Ecologist. ➤ All the above-mentioned general guidelines and requirements will be confirmed by the Geotechnical Engineer prior to construction.		

MM32	Dewatering and Borrow Pit Drainage	<i>Appendix 4-4:</i>	Pumping of water from excavations will be necessary, so localised and temporary groundwater lowering cannot be avoided if or where it is implemented. Quantities will be small given the generally low-permeability characteristics of both the till and the bedrock groundwater flow system. Additionally, excavations will remain relatively shallow and most turbine bases and proposed borrow pits are located in elevated areas near hilltops. Pumping and water management is a matter of routine for contractors familiar with this type of development and activity. No direct discharges to streams will be permitted, and this will be enforced by the ECoW. All pumped water must be led and pass through a suitably sized settling basin prior to diffuse discharge to ground or a drain away from the excavation location. Other relevant measures are: > Interceptor drains will be established around the perimeter of borrow pits. These drains will divert any surface water away from the borrow pits and hence prevent water from ponding and lodging during construction (and also when reinstated). > Stilling ponds have been designed at the lower side/outfall location of the borrow pits.		
MM33	Wastewater Management	<i>ELAR Chapter 4</i> <i>Appendix 4-3</i>	Temporary port-a-loo toilets and toilets located within a staff portacabin will be used during the construction phase. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by permitted waste collector to wastewater treatment plants.		
MM34	Dust Suppression	<i>ELAR Chapter 4</i> <i>ELAR Appendix 4-3</i>	Construction dust can be generated from many on-site activities such as excavation and backfilling. The extent of dust generation will depend on the type of activity undertaken, the location, the nature of the dust, i.e., soil, sand, etc. and the weather. In addition, dust dispersion is influenced by external factors such as wind speed and direction and/or, periods of dry weather. Construction traffic movements also have the potential to generate dust as they travel along the haul route.		

			In periods of extended dry weather, dust suppression may be required within the Site, to prevent dust from becoming a nuisance. If necessary, water will be taken from stilling/settlement ponds in the drainage system and will be pumped into a bowser or water spreader to dampen down haul roads and construction compounds to prevent the generation of dust. Silty or oily water will not be used for dust suppression, because this would transfer the pollutants to the haul roads and generate polluted runoff or more dust. Water bowser movements will be carefully monitored, as the application of too much water may lead to increased runoff. Proposed measures to control dust include: > Sporadic wetting of loose stone surface will be carried out during the construction phase to minimise movement of dust particles to the air. In periods of extended dry weather, dust suppression may be necessary along haul roads to ensure dust does not cause a nuisance. Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff. > All plant and materials vehicles shall be stored in dedicated areas within the Site. > Areas of excavation will be kept to a minimum, and stockpiling will be minimised by coordinating excavation, spreading and compaction. > Construction traffic will use specified haul routes only. > The agreed haul route road adjacent to the Site will be regularly inspected for cleanliness and cleaned as necessary. > The roads adjacent to the Site entrances will be checked weekly for damage/potholes and repaired as necessary. > The transportation of materials from the borrow pit around the Site will be covered by tarpaulin or similar covered vehicles where necessary. > Any required transportation of construction materials from locally sourced quarries to the Site will be covered by tarpaulin where necessary. > If necessary, excavated material will be dampened prior to transport to the borrow pits. > Waste material will be transferred to a licensed/permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF facility will be		
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			local to the Proposed Project to reduce the level of emissions associated with vehicle movement.		
MM35	Noise Control	<i>ELAR Appendix 4.3</i>	The contract documents will specify that the contractor undertaking the construction works will be obliged to adopt best practice noise abatement measures contained in British Standard BS 5228-1:2009+A1:2014 ‘Code of practice for noise and vibration control on construction and open sites – Noise’ and BS 5228-2:2009+A1:2014 ‘Code of practice for noise and vibration control on construction and open sites – Vibration’. The following best practice mitigation measures from these documents will be implemented as required for the duration of the construction and decommissioning phases: ➤ Limiting the hours during which site activities likely to create high levels of noise or vibration are permitted; ➤ Establishing channels of communication between the contractor/developer, Local Authority and residents; ➤ Monitoring typical levels of noise and vibration during critical periods and at sensitive locations; ➤ Selection of plant with low inherent potential for generation of noise and/ or vibration where practical; ➤ Placing of noise generating / vibratory plant as far away from sensitive receptors as practical within the site constraints, and; ➤ The hours of construction activity will be limited to avoid unsociable hours where possible. Works operations shall generally be restricted to between 7:00hrs and 19:00hrs Monday to Saturday. However, to ensure that optimal use is made of good weather periods or at critical periods within the programme (i.e. concrete pours, turbine component deliveries) it could occasionally be necessary to work out of these hours. ➤ The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations. ➤ Compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers.		

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

			hazard tape in order to identify the species prior to vegetation clearance works and to keep it separate from other brash material. > All machinery should be thoroughly cleaned down prior to arriving on the Site to avoid the potential spread of invasive species from elsewhere. > Machinery that is used for excavation and onsite removal of invasive material will not be used for any other works until they are fully cleaned down and then visually inspected by a specialist to ensure no fragments of invasive plant material are present. > Prior to leaving the invasive species exclusion zones, all boots and clothing will be thoroughly brushed down to remove any contaminated material prior to leaving the area. > As a precautionary measure, machinery will be thoroughly cleaned down before exiting the Site to prevent potential spread of invasive species elsewhere. > Clean down will be carried out using brushes and shovels and power washing will be avoided insofar as possible. This is to prevent potentially contaminated run-off spreading outside the Site. > Material used for tracking machinery out of the contaminated areas onsite e.g. plywood will be thoroughly cleaned down under supervision of the ECoW prior to removal off site. > Any soil and topsoil required on the Site will be sourced from a stock that has been screened for the presence of any invasive species and where it is confirmed that none are present. Construction Management Measures > Prior to the commencement of any works, the following site setup procedures will be carried out: > A pre-commencement survey for Rhododendron and any other invasive species will be undertaken by a fully qualified ecologist to determine the locations and extent of the species within the Proposed Wind Farm and to determine whether there have been any changes in the extent of the infestation since the undertaking of the baseline surveys.		
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			> The locations and extent of Rhododendron (or any other invasive species) within the Proposed Wind Farm will be clearly marked out using hazard tape to ensure they are not disturbed. > For Rhododendron stands that occur outside of the permanent built infrastructure footprint and will not be directly impacted, a 10m buffer zone (Higgins, G.T. 2008) surrounding each stand will also be applied using temporary fencing, to avoid disturbance of potentially contaminated soils. Due to the young age and small size of the infestations recorded within the Proposed Wind Farm, it is proposed to treat the plant in-situ. The recommended option for in-situ treatment is to manually remove the upper parts of the plant and apply the Ecoplug method (Willoughby et al. 2017) as to avoid spray drift and to minimise the potential for spraying of non-target species. An Ecoplug is a sealed plastic capsule containing a measured dose of granular glyphosate herbicide. The capsule is inserted into a drilled hole in a freshly cut tree stump and hammered into place. Once activated, the glyphosate is released into the stump's vascular system and transported throughout the stump and root system, killing the tree and preventing regrowth. The Ecoplug method is outlined below. > Cut the tree/plant as close to the ground as possible. > The cut material can be stacked and stored onsite, used as firewood or mulched. > A 30 mm hole will be drilled into the remaining stump and the Ecoplug will be inserted into the hole until it is flush with the top of the stump. > Where immature plants occur, hand pulling can be undertaken at any time of the year and left to dry out on an impermeable surface. Where the Ecoplug method is unsatisfactory or where the plant requires removal due to being present within the permanent built infrastructure footprint, physical extraction of the root/stump from the ground will be carried out. > Cut the tree/plant as close to the ground as possible. > The root/stump will be removed from the ground using hand tool or an excavator. > The cut material can be stacked and stored within the Proposed Wind Farm, used as firewood or mulched.		
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			> The root/stump will be placed on an impermeable surface such as palettes or a radon barrier membrane and left to dry out. Following treatment or eradication of the plant, excavated soil from the Site of infestations at the Proposed Wind Farm will still be considered to be contaminated on a precautionary basis. In order to avoid the potential spread of the species, the top layer of soil from the 10m buffer zone will be removed and transported to an offsite waste facility, under license from the NPWS.		
MM37	Waste Management	<i>ELAR Chapter 4</i> <i>Appendix 4-3</i>	Construction waste will arise on the project mainly from excavation and unavoidable construction waste including material surpluses and damaged materials and packaging waste. Appropriate measures will be taken to ensure excess waste is not generated during construction, including: > Ordering of materials will be on an 'as needed' basis to prevent over supply to the Site. Co-ordination is required with suppliers enabling them to take/buy back surplus stock; > Purchase of materials pre-cut to length to avoid excess scrap waste generated on-site; > Request that suppliers use least amount of packaging possible on materials delivered to the Site; > Ensuring correct storage and handling of goods to avoid unnecessary damage that would result in their disposal; > Ensuring correct sequencing of operations; > Use reclaimed materials in the construction works. > Hazardous waste will be kept separate from all other construction waste to prevent contamination and removed appropriately. All waste generated on site will be contained in waste skips at a waste storage area on site. This waste storage area will be kept tidy with skips clearly labelled to indicate the allowable material to be disposed of therein.		

			The expected waste volumes generated on site are unlikely to be large enough to warrant source segregation at the Proposed Wind Farm site. Therefore, all wastes streams generated on site will be deposited into a single waste skip. This waste material will be transferred to a Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The waste generated from the turbine erection will be limited to the associated protective covers which are generally reusable. Considering the specialist nature of this packaging material the majority will be taken back by suppliers for their own reuse. Any other packaging waste generated from the turbine supply will be deposited into the on-site skips and subsequently transferred to the MRF. Site personnel will be instructed at induction that under no circumstances can waste be brought to site for disposal in the on-site waste skip. It will also be made clear that the burning of waste material on site is forbidden.		
MM38	Emergency Response	<i>Appendix 4-3:</i>	In the event of an emergency situation the Site Supervisor/Construction Manager will carry out the following: ➤ Establish the scale of the emergency situation and identify the number of personnel, if any, have been injured or are at risk of injury. ➤ Where necessary, sound the emergency siren/foghorn that activates an emergency evacuation on the Site. The Site Supervisor/Construction Manager must proceed to the assembly point if the emergency poses any significant threat to their welfare and if there are no injured personnel at the scene that require assistance. The Site Supervisor/Construction Manager will be required to use their own discretion at that point. In the case of fire, the emergency evacuation of the Site should proceed, without exception. The Site evacuation procedure is outlined in Section 6.1.3 of Appendix 4-3: CEMP.		

			> Make safe the area if possible and ensure that there is no identifiable risk exists with regard to dealing with the situation e.g., if a machine has turned over, ensure that it is in a safe position so as not to endanger others before assisting the injured. > Contact the required emergency services or delegate the task to someone. If delegating the task, ensure that the procedures for contacting the emergency services as set out in Section 6.3 of Appendix 4-3: CEMP is followed. > Take any further steps that are deemed necessary to make safe or contain the emergency incident e.g., cordon off an area where an incident associated with electrical issues has occurred. > Contact any regulatory body or service provider as required e.g., ESB Networks > Contact the next of kin of any injured personnel where appropriate.		
MM39	Site Evacuation/Fire Drill	ELAR Appendix 4-3	A site evacuation/fire drill procedure will provide basis for carrying out the immediate evacuation of all site personnel in the event of an emergency. The following steps will be taken: > Notification of the emergency situation. Provision of a siren or foghorn to notify all personnel of an emergency situation. > An assembly point will be designated in the construction compound area and will be marked with a sign. All site personnel will assemble at this point. > A roll call will be carried out by the Site Security Officer to account for all personnel on site. > The Site Security Officer will inform the Site Supervisor/Construction Manager when all personnel have been accounted for. The Site Supervisor/Construction Manager will decide the next course of action, which be determined by the situation that exists at that time and will advise all personnel accordingly. All personnel will be made aware of the evacuation procedure during site induction. The Fire Services Acts of 1981 and 2003 require the holding of fire safety evacuation drills at specified intervals and the keeping of records of such drills.		

MM40	Spill Control measures	Appendix 4-3:	Oil/fuel spillages are one of the main environmental risks that will exist on the Site which will require an emergency response procedure. The following steps provide the procedure to be followed in the event of such an incident: > Stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers. > If applicable, eliminate any sources of ignition in the immediate vicinity of the incident. > Contain the spill using the spill control materials, track mats or other material as required. Do not spread or flush away the spill. > If possible, cover or bund off any vulnerable areas where appropriate such as drains, watercourses or sensitive habitats. > If possible, clean up as much as possible using the spill control materials. > Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited. > Notify the ECoW immediately giving information on the location, type and extent of the spill so that they can take appropriate action. > The ECoW will inspect the Site and will assist by providing any advice possible to ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring. > The Construction Manager will notify the appropriate regulatory body such as Waterford City & County Council, Inland Fisheries Ireland (IFI), National Parks and Wildlife Service (NPWS), etc. if deemed necessary. The importance of a swift and effective response in the event of such an incident occurring cannot be over emphasised. Environmental incidents are not limited to just fuel spillages. Therefore, any environmental incident must be investigated in accordance with the following steps. > The ECoW must be immediately notified.		
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			> The details of the incident will be recorded on an Environmental Incident Form which will provide information such as the cause, extent, actions and remedial measures used following the incident. The form will also include any recommendations made to avoid reoccurrence of the incident. > If the incident has impacted on an ecologically sensitive receptor, such as a sensitive habitat, protected species or designated conservation site (pSPA or cSAC), the ECoW will liaise with the Project Ecologist. > If the incident has impacted on a sensitive receptor such as an archaeological feature the ECoW will liaise with the Project Archaeologist. > A record of all environmental incidents will be kept on file by the ECoW and the Project Contractor. These records will be made available to the relevant authorities such as Waterford City & County Council, IFI, NPWS, etc. if required. The ECoW will be responsible for any corrective actions required as a result of the incident e.g. an investigative report, formulation of alternative construction methods or environmental sampling, and will advise the Project Contractor as appropriate.		
Operational Phase					
MM41	Project Maintenance	<i>EIAR Chapter 4</i> <i>Appendix 4-3</i>	Each turbine will be subject to a routine maintenance programme involving several checks and changing of consumables, including oil changes. The meteorological mast will be subject to a routine maintenance programme involving several checks and changing of instrumentation when required. In addition, there will be a requirement for unscheduled maintenance, which could vary between resetting alarms to major component changes requiring a crane. Typically, maintenance traffic will consist of four-wheel drive vehicles or vans. Maintenance of the site roads will involve filling potholes and maintaining road edge markers. Drainage maintenance will typically involve cleaning of drainage ditches when required to prevent water backing up. The Proposed 110kV Substation and Proposed 220kV Loop-in Substation will also require periodic maintenance. Both substations would be operational 24 hours per day, 7 days a week throughout the year. Substations can be operated remotely and manually. Supervisory operational and monitoring activities will be carried out remotely using a SCADA system,		

			with the aid of computers connected via a telephone modem link. The following maintenance procedures will also be adhered. > Periodic service and maintenance works which include some vehicle movement. > For operational and inspection purposes, substation access is required. > Servicing of the substation equipment will be carried out in accordance with the manufacturer's specifications, which would be expected to entail the following: ○ Six-month service – three-week visit ○ Annual service – six-week visit ○ Weekly visits as required. Occasional technical problems may require maintenance visits by technical staff. During the six-month and annual service visits, some waste (lubricating and cooling oils, packaging from spare parts or equipment, unused paint, etc.) will arise. This will be recorded and removed from the site and reused, recycled or disposed of in accordance with the relevant legislation in an authorised facility.		
MM42	Wastewater Management	<i>ELAR Chapter 4</i>	It is not proposed to treat wastewater on site. Wastewater from the staff welfare facilities within the Proposed 110kV Substation and Proposed 220kV Loop-in Substation the control buildings will be managed by means of sealed storage tanks, with all wastewater being tankered off site by permitted waste collector to a licenced wastewater treatment plant. Such a proposal for managing the wastewater arising on site has become almost standard practice at substations, which are often proposed in areas where finding the necessary percolation requirements for on-site treatment would be challenging and has been accepted by numerous Planning Authorities and An Coimisiún Pleanála as an acceptable proposal. The proposed wastewater storage tanks will be fitted with an automated alarm system that will provide sufficient notice that the tank requires emptying. Full details of the proposed tank alarm system can be submitted to the Planning Authority in advance of any works commencing on-site. The wastewater storage tank alarm will be part of a continuous stream of data from the Proposed 110kV Substation and Proposed 220kV Loop-in Substation that		

			will be monitored remotely 24 hours a day, 7 days per week. Only waste collectors holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007 (as amended), will be employed to transport wastewater away from the Proposed 110kV Substation and Proposed 220kV Loop-in Substation underground storage tanks.		
Decommissioning Phase					
MM43	Decommissioning Plan	<i>ElAR Chapter 4 Appendix 4-6</i>	A Decommissioning Plan has been prepared (Appendix 4-6). The Decommissioning Plan will be updated prior to the end of the operational period in line with decommissioning methodologies that may exist at the time and will agree with the competent authority at that time. As noted in the Scottish Natural Heritage report (SNH) <i>Research and Guidance on Restoration and Decommissioning of Onshore Wind Farms</i> (SNH, 2013) reinstatement proposals for a wind farm are made approximately 30 years in advance, so within the lifespan of the Proposed Wind Farm, technological advances and preferred approaches to reinstatement are likely to change. According to the SNH guidance, it is therefore: “best practice not to limit options too far in advance of actual decommissioning but to maintain informed flexibility until close to the end-of-life of the wind farm”.		
MM44	Site Drainage	<i>Appendix 4-6</i>	The site drainage features for this Proposed Wind Farm site during its construction and operation are outlined in the ElAR and detailed in depth in Appendix 4-4 Surface Water Management Plan which accompanies this application. When the final Decommissioning Plan is prepared prior to decommissioning and presented as a standalone document, all drainage management measures, which will include maintenance of the operational drainage measures, will be included in that document, as required. The drainage proposals will be developed further prior to the commencement of decommissioning if deemed necessary. However, it should be noted that by the time decommissioning is undertaken after the planned 35-year operational period of the		

			Proposed Turbines, the areas within the Proposed Wind Farm will have revegetated resulting in a resumption of the natural drainage management that will have existed prior to any construction. It is not anticipated that the decommissioning phase will interrupt this restored drainage regime in any way with the works proposed. As a minimum measure, areas where freshly placed soil material as part of turbine foundation reinstatement will be surrounded by silt fencing if deemed necessary until the area has naturally revegetated.		
MM45	Refuelling, Fuel and Hazardous Material Storage	<i>Appendix 4-6:</i>	Wherever possible, vehicles will be refuelled off-site, particularly for regular road-going vehicles. On-site refuelling of machinery will be carried out at designated refuelling areas at various locations throughout the Site. Heavy plant and machinery will be refuelled on-site by a fuel truck that will come to the Site as required on a scheduled and organised basis. All refuelling will be carried out outside designated watercourse buffer zones. Only designated trained competent operatives will be authorised to refuel plant onsite. Mobile measures such as drip trays and fuel absorbent mats will be used during refuelling operations as required. All plant and machinery will be equipped with fuel absorbent material and pads to deal with any event of accidental spillage. The following mitigation measures are proposed to avoid release of hydrocarbons at the Site: > Minimal refuelling or maintenance of vehicles or plant associated with decommissioning will take place on site. Where possible, off-site refuelling will occur at a controlled fuelling station; > On-site re-fuelling will be undertaken using a refuelling truck with spill kits kept on site for accidental leakages or spillages; > Only designated trained operatives will be authorised to refuel plant on-site; > Taps, nozzles or valves associated with refuelling equipment will be fitted with a lock system; > Fuels stored on-site will be minimised. All storage areas will be bunded appropriately for the duration of the decommissioning phase. All bunded areas will be fitted with a		

			storm drainage system and an appropriate oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area; > Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage; > > The plant used during decommissioning will be regularly inspected for leaks and fitness for purpose.		
MM46	Dust Control	Appendix 4-6:	Dust can be generated from on-site activities during decommissioning such as reinstatement of foundations and travelling on site roads during prolonged periods of dry weather. The extent of dust generation will depend on the type of activity undertaken, the location, the nature of the dust, i.e. soil, and the weather. In addition, dust dispersion is influenced by external factors such as wind speed and direction and/or, periods of dry weather. Site traffic movements also have the potential to generate dust as they travel along the haul route. If necessary, haul roads and other areas of hardstanding will be damped down by water spray or water misting to prevent the generation of dust. Proposed measures to control dust, which are the same as those proposed for the construction phase, include: > Groundworks (i.e. works with potential to create dust) associated with the decommissioning of the Proposed Wind Farm will be fully supervised by an ECoW. > If any signs of habitat degradation are noted, the dust-producing works will be immediately halted and further mitigation provided. > The ECoW will have power to halt decommissioning works if required as outlined above. > Sporadic wetting of loose stone surface will be carried out during the decommissioning phase to minimise movement of dust particles to the air. In periods of extended dry weather, dust suppression may be necessary along haul roads to ensure dust does not cause a nuisance. Water bowser movements will be carefully monitored by the ECoW to avoid, insofar as reasonably possible, increased runoff.		

			> All plant and materials vehicles shall be stored in dedicated areas within the Site. > Traffic associated with decommissioning will be transported to the Site on specified haul routes only. > The agreed haul route road adjacent to the Site will be regularly inspected for cleanliness and cleaned as necessary. > The roads adjacent to the Site proposed new entrance will be checked weekly for damage/potholes and repaired as necessary. > Waste material will be transferred to a licensed/permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF facility will be local to the Proposed Project to reduce the amount of emissions associated with vehicle movement.		
MM47	Noise Control	Appendix 4-6:	The operation of plant and machinery, including site vehicles, is a source of potential impact that will require mitigation at all locations within the Site. To avoid unsociable hours where possible, decommissioning works will be restricted to occur between 07:00hrs and 19:00hrs Monday to Saturday, which are the same as those proposed during the construction phase. Proposed measures to control noise include: > Limiting the hours during which site activities likely to create high levels of noise or vibration are permitted; > Establishing channels of communication between the contractor/developer, Local Authority and residents; > Monitoring typical levels of noise and vibration during critical periods and at sensitive locations; > Selection of plant with low inherent potential for generation of noise and/ or vibration where practical; > Placing of noise generating / vibratory plant as far away from sensitive receptors as practical within the site constraints, and; > The hours of decommissioning activity will be limited to avoid unsociable hours where possible. Works operations shall generally be restricted to between 7:00hrs and 19:00hrs Monday to Saturday. However, to ensure that optimal use is made of good		

			weather periods or at critical periods within the programme it could occasionally be necessary to work out of these hours. And more specifically: > The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations. > Compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers. > Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use. Any plant, such as generators or pumps, which is required to operate outside of general decommissioning work hours will be surrounded by an acoustic enclosure or portable screen as appropriate.		
MM48	Ground Disturbance, Material Excavation & Reinstatement	<i>Appendix 4-6:</i>	During decommissioning, all plant and machinery will keep to permanent built infrastructure and will not encroach upon adjacent habitats unless this is essential in order to progress the decommissioning works. In the event of any necessary encroachment into adjoining habitats; appropriate trackway or matting shall be placed to avoid any loss of the adjoining habitat. The reinstatement of any areas disturbed during the decommissioning works will be undertaken. The contractor will record excavated volumes and storage areas, and volumes and type of material utilised for reinstatement of relevant areas. This information will be updated for the duration of the decommissioning works. Reinstatement will be completed using site-won materials wherever possible without compromising or damaging established/existing habitats. Natural vegetation will be preferred; however, native seed mixes may also be selected to complement surrounding species. The seed mix and method of application will be agreed with a suitably qualified		

			ecologist to ensure that the reinstated habitats are compatible with those existing and surrounding the reinstated areas at the time of decommissioning. All temporarily stockpiled materials will be stored in designated areas and isolated from any surface drains and a minimum of 50m away from surface water where possible. Aggregate or fine materials storage will be enclosed and screened/sheeted. No storage of materials within sensitive habitats will be permitted. Soil and vegetation must be stored separately from subsoil and shall be retained and reinstated on all areas of stripped ground as soon as possible to prevent erosion and leaching/loss of nutrients.		
MM49	Biodiversity	<i>Appendix 4-6:</i> <i>Chapter 8:</i> <i>Chapter 9:</i>	Regarding Biodiversity at the Site, the decommissioning phase will involve the following best practice mitigation measures: > The areas within 50m of the hard-stand and turbine foundations will be subject to a pre-works terrestrial ecology walkover to highlight any constraints that may be present (e.g. breeding or resting places of protected species, presence of Invasive Plant Species). If any significant constraints are identified appropriate controls will be developed and integrated into the live decommissioning plan ahead of the commencement of the work. > If any Third Schedule Invasive species are present in or adjacent to the works footprint, an Invasive Species Management Plan (ISMP) will be developed, and all recommendations implemented in accordance with the contemporary best practice measures. > Speed limits will be enforced on internal roads. > All edible wastes will be stored in covered segregated containers and disposed of at licensed facilities. > No refuelling or other hydrocarbon related usage will be undertaken within 50m of any watercourse in relation to maintenance vehicles, plant or machinery.		

			➤ Any import of soil or fill necessary in the decommissioning process shall be from approved sources and appropriately tested or inspected to minimise the risk of import of invasive species. Only soil appropriate to the Site (pH, soil type) will be used. The re-seeding or natural revegetation of reinstated areas will proceed on the advice of a suitably qualified ecologist. Any seed mix used will be on the approval of the ecologist.		
MM50	Invasive Species Management	Appendix 4-6:	Any soil material that will be imported to the Proposed Wind Farm site as part of the foundation reinstatement of Proposed Turbines, the met mast, the telecommunications relay mast and construction compounds will be free of any invasive species (listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011). The Site Manager will take steps to ensure the sourcing of suitably clean soil material and verify the quality of the material by having it inspected prior to bringing it to site by a suitably qualified ecologist. Prior to decommissioning, a suitably qualified ecologist will complete an invasive species survey of the Site to identify invasive species where any minor excavation will be required. If present in these areas, the ecologist will propose suitable management measures. The measures outlined in Appendix 6-5: Invasive Species Management Plan will be followed. Should any additional Invasive Species be identified an updated ISMP shall be prepared in advance of decommissioning works.		
MM51	Ornithology	Appendix 4-6:	Regarding ornithology and avian populations, the Decommissioning Plan will include industry best practice measures to mitigate the impact of works on birds, which may include the following: ➤ No removal of woody vegetation or scrub will be carried out within the bird breeding season (March 1st to August 31st) ➤ Vantage Point surveys will be carried out for the season before and during the decommissioning process. ➤ The areas within 50m of the hard-stand and turbine foundations will be subject to a pre-works ornithology walkover to highlight any constraints that may be present (e.g. breeding or resting places of protected species). If any significant constraints are		

			identified, appropriate controls will be developed and integrated into the live decommissioning plan ahead of the commencement of the work. > Speed limits will be enforced on internal roads.		
MM52	Traffic Management	<i>Appendix 4-6:</i>	A TMP will be prepared in advance of any decommissioning works. The removal of turbines from the Proposed Wind Farm site will be undertaken for a specialist haulier. The traffic management arrangements although similar to those that will be implemented for turbine delivery as outlined in the EIAR will be agreed in advance of decommissioning with Waterford City and County Council.		
MM53	Waste Management	<i>Appendix 4-6:</i>	Prior to the commencement of the decommissioning, a Decommissioning Waste Manager will be appointed by the Contractor. The Decommissioning Waste Manager will oversee the implementation of the objectives of the Resource & Waste Management Plan (RWMP). The relevant components will be removed from the Proposed Wind Farm for re-use, recycling or waste disposal. Any structural elements that are not suitable for recycling will be disposed of in an appropriate manner. All lubrication fluids will be drained down and put aside for appropriate collection, storage, transport and disposal. Any materials which cannot be re-used or recycled will be disposed of by an appropriately licenced contractor. Reuse Many construction materials can be reused several times before they have to be disposed of: > Electrical wiring can be reused on similar wind energy projects. > Elements of the turbine components can be reused but this will be determined by the condition that they are in Recycling		

			> If a certain type of material cannot be reused onsite, then recycling is the most suitable option. The opportunity for recycling during decommissioning will be limited and restricted to components of the wind turbines. > All waste that is produced during the decommissioning phase including dry recyclables will be deposited in the on-site skip initially and sent for subsequent segregation at a remote facility. The anticipated volume of all waste material to be generated at the Site is low which provides the justification for adopting this method of waste management.		
ELAR Chapter 5: 'Population and Human Health'					
Pre-Commencement Phase					
MM54	Mitigation by Design	Chapter 5:	The Proposed Wind Farm has been designed in accordance with the parameters set out in the Guidelines (DoEHLG, 2006) and with cognisance of the Draft Guidelines (DoHPLG, 2019), adhering to the required setback distances from sensitive receptors set out in those documents.		
MM55	Major Accidents and Natural Disasters	Chapter 5:	> The Proposed Project will be designed and built in line with current best practice and, as such, mitigation against the risk of major accidents and/or disasters will be embedded through the design. In accordance with the provision of the European Commission 'Guidance on the preparation of Environmental Impact Assessment Reports' 2017, a Risk Management Plan will be prepared and implemented onsite to ensure an effective response to disasters or the risk of accidents. The plan will include sufficient preparedness and emergency planning measures. > The Proposed Project will also be subject to a fire safety risk assessment in accordance with Chapter 19 of the Safety, Health and Welfare at Work Acts 2005 to 2014, which will assist in the identification of any major risks of fire onsite, and mitigation of the same during operation.		
MM56	Notification of Works	Chapter 5:	Prior to commencement of any works, the occupants of dwellings in the vicinity of the proposed works will be contacted and the scheduling of works will be made known. Local		

		<i>Appendix 15-3</i>	access to properties will also be maintained throughout any construction works and local residents will be supplied with the number of the works supervisor in order to ensure that disruption will be kept to a minimum.		
Construction Phase					
MM57	Land Use Activities and Patterns	<i>Chapter 5:</i>	➤ The Proposed Project has been designed to minimise permanent land-take by optimising the location of turbines and associated infrastructure and, where practicable, utilising existing forestry tracks and disturbed areas. ➤ The Proposed 110kV Underground Cabling Route will be installed predominantly within the existing public road corridor, thereby reducing the requirement for permanent occupation of previously undeveloped land. ➤ Construction compounds, working areas and cable installation corridors will be reinstated following completion of the works. Borrow pit voids will be progressively backfilled with suitable excavated spoil and subsequently reseeded or allowed to revegetate naturally.		
MM58	Health	<i>Chapter 5:</i> <i>'Appendix 4-3:</i>	The Proposed Project will be constructed in accordance with all relevant Health and Safety Legislation, including: ➤ Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005); ➤ Safety, Health and Welfare at Work (General Application) (Amendment) Regulations 2016 (S.I. No. 36 of 2016); ➤ S.I. No. 528/2021 - Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021 and ➤ Safety, Health and Welfare at Work (Work at Height) Regulations 2006 (S.I. No. 318 of 2006). Furthermore: ➤ A Health and Safety Plan covering all aspects of the construction process will address the Health and Safety requirements in detail. This will be prepared on a preliminary basis at the procurement stage and developed further at construction stage.		

			> All hazards will be identified, and risks assessed. Where elimination of the risk is not feasible, appropriate mitigation and/or control measures will be established. The contractor will be obliged under the construction contract and current health and safety legislation to adequately provide for all hazards and risks associated with the construction phase of the project. Safepass registration cards are required for all construction, delivery and security staff. Construction operatives will hold a valid Construction Skills Certificate Scheme card where required. The developer is required to ensure a competent contractor is appointed to carry out the construction works. The contractor will be responsible for the implementation of procedures outlined in the Safety and Health Plan. Public safety will be addressed by restricting Site access during construction. Fencing will be erected in areas of the Site where uncontrolled access is not permitted. > The suitability of machinery and equipment for use near power lines will be risk assessed. > All staff will be trained on operating voltages of overhead electricity lines running the Site. All staff will be trained to be aware of the risks associated with overhead lines. All contractors that may visit the Site are made aware of the location of lines before they come on to Site. > When activities must be carried out beneath overhead lines, e.g., component delivery or substation construction, a site-specific risk assessment will be undertaken prior to any works. The risk assessment must take into account the maximum potential height that can be reached by the plant or equipment that will be used prior to any works. Overhead line proximity detection equipment will be fitted to machinery when such works are required. > Information on safe clearances will be provided to all staff and visitors. > Signage indicating locations and health and safety measures regarding overhead lines will be erected in canteens and on Site. > Goal posts will be established, where necessary, under overhead electricity lines for the entirety of the construction phase of the Proposed Wind Farm. Specifically, the construction of the Proposed 110kV Underground Cabling Route will be in phases along the Proposed 110kV Underground Cabling Route. Prior to commencing grid connection works in the agricultural fields in the townland of Ballycullane and Graigue, goal posts will be established under the 220kV overhead line and remain in		
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			place for the duration of the works in this area. The goal posts will not exceed a height of 4.2 metres, unless specifically agreed with ESB Networks. > All staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021'. This will encompass the use of all necessary Personal Protective Equipment and adherence to the Site Health and Safety Plan. The scale and scope of the project necessitates that a Project Supervisor Design Process (PSDP) and Project Supervisor Construction Stage (PSCS) are required to be appointed in accordance with the provisions of the Health & Safety Authority's <i>'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2013'</i>. The PSDP appointed for the construction stage shall be required to perform his/her duties as prescribed in the Safety, Health and Welfare at Work (Construction) Regulations. These duties include (but are not limited to): > Identify hazards arising from the design or from the technical, organisational, planning or time related aspects of the project; > Where possible, eliminate the hazards or reduce the risks; > Communicate necessary control measures, design assumptions or remaining risks to the PSCS so they can be dealt with in the Safety and Health Plan; > Ensure that the work of designers is coordinated to ensure safety; > Organise co-operation between designers; > Prepare a written Safety and Health Plan; > Prepare a safety file for the completed structure and give it to the client; and > Notify the Authority and the client of non-compliance with any written directions issued. The PSCS appointed for the construction stage shall be required to perform his/her duties as prescribed in the Safety, Health and Welfare at Work (Construction) Regulations. These duties include (but are not limited to):		
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			> Development of the Safety and Health Plan for the construction stage with updating where required as work progresses; > Compile and develop safety file information. > Reporting of accidents / incidents; > Weekly Site meeting with PSCS; > Coordinate arrangements for checking the implementation of safe working procedures. Ensure that the following are being carried out: > Induction of all Site staff including any new staff enlisted for the project from time to time; > Toolbox talks as necessary; > Maintenance of a file which lists personnel on Site, their name, nationality, current Safe Pass number, current Construction Skills Certification Scheme (CSCS) card (where relevant) and induction date; > Report on Site activities to include but not limited to information on accidents and incidents, disciplinary action taken and PPE compliance; > Monitor the compliance of contractors and others and take corrective action where necessary; and > Notify the Authority and the client of non-compliance with any written directions issued.		
Operational Phase					
MM59	Health and Safety	Chapter 5:	The following mitigation measures will be implemented during the operation of the Proposed Project to ensure that the risks posed to staff and landowners remain imperceptible throughout the operational life of the Proposed Project. > Access to the turbines is through a door at the base of the structure, which will be locked at all times outside maintenance visits. The doors will only be unlocked as required for entry by authorised personnel and will be locked again following their exit.		

			> Staff associated with the project will conduct frequent visits, which will include inspections to establish whether any signs have been defaced, removed, faded, or are becoming hidden by vegetation or foliage, with prompt action taken as necessary. > Signs will also be erected at suitable locations across the Site as required for the ease and safety of operation of the wind farm. These signs include: > Buried cable route markers at regular intervals and change of cable route direction; > Directions to relevant turbines at junctions; > “No access to Unauthorised Personnel” at appropriate locations; > Speed limits signs at Site entrance and junctions; > “Warning these Premises are alarmed” at appropriate locations; > “Danger HV” at appropriate locations; > “Warning – Keep clear of structures during electrical storms, high winds or ice conditions” at Site entrance; > “No unauthorised vehicles beyond this point” at specific Site entrances; and > Other operational signage required as per Site-specific hazards. > The Proposed 110kV Substation, which will be operated by EirGrid, will be locked and fenced off from public access. The substation will be operational remotely and manually 24 hours per day, 7 days a week. Supervisory operational and monitoring activities will be carried out remotely using a SCADA system, with the aid of computers connected via a telephone modem link. > Periodic service and maintenance work which include some vehicle movement. > For operational and inspection purposes, substation access is required. > An operational phase Health and Safety Plan will be developed to fully address identified Health and Safety issues associated with the operation of the Site. Access for emergency services will be available at all times. > The components of a wind turbine are designed to last up to 35 years and are equipped with a number of safety devices to ensure safe operation during their lifetime		
MM60	Noise and Vibration	Chapter 5:	> The selection and location of mechanical and electrical plant will be undertaken in order to ensure the noise emission limits set out above are not exceeded.		

			> All mechanical plant items e.g. fans, pumps etc. shall be regularly maintained to ensure that excessive noise generated any worn or rattling components is minimised. > Any new or replacement mechanical plant items, including plant located inside, shall be designed so that all noise emissions from site do not exceed the noise limits. > There are no tonal or impulsive characteristics from the plant operation audible at any NSL during night time periods.		
MM61	Air Quality	Chapter 5:	> Any vehicles or plant brought onsite during the operational phase will be maintained in good operational order that comply with the Road Traffic Acts 1961 as amended, thereby minimising any emissions that arise. > When stationary, delivery and onsite vehicles will be required to turn off engines. > Waste material will be transferred to a licensed/permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. > The MRF facility will be local to the Site to reduce the emissions associated with vehicle movements.		
MM62	Shadow Flicker	Chapter 5:	<u>Screening Measures</u> In the event of an occurrence of shadow flicker exceeding guideline threshold values of 30 minutes per day at sensitive receptors, mitigation options will be discussed with the affected homeowner, including: > Installation of appropriate window blinds in the affected rooms of the residence; > Planting of screening vegetation; > Other site-specific measures which might be agreeable to the affected party and may lead to the desired mitigation. If agreement can be reached with the homeowner, then it would be arranged for the required mitigation to be implemented in cooperation with the affected party as soon as practically possible and for the full costs to be borne by the wind farm operator. <u>Wind Turbine Control Measures</u>		

			If it is not possible to mitigate any identified shadow flicker limit exceedance locally using the measures detailed above, wind turbine control measures will be implemented. Wind turbines can be fitted with shadow flicker control units to allow the turbines to be controlled to prevent the occurrence of shadow flicker at properties surrounding the wind farm. The shadow flicker control units will be added to any required turbines. A shadow flicker control unit allows a wind turbine to be programmed and controlled using the wind farm's Supervisory Control and Data Acquisition (SCADA) system to change a particular turbine's operating mode during certain conditions or times, or even turn the turbine off if necessary. All predicted incidents of shadow flicker can be pre-programmed into the wind farm's control software. The wind farm's SCADA control system can be programmed to shut down any particular turbine at any particular time on any given day to avoid excessive shadow flicker occurrences at properties which are not naturally screened or cannot be screened with measures outlined above. Where such wind turbine control measures are to be utilised, they need only be implemented when the specific combined circumstances occur that are necessary to give rise to the shadow flicker effect in the first instance. Therefore, if the sun is not shining on a particular day that shadow flicker was predicted to occur at a nearby property, there would be no need to shut down the relevant turbines that would have given rise to the shadow flicker at the property. Similarly, if the wind speed was below the cut-in speed that caused the turbine rotor to rotate and give rise to a shadow flicker effect at a nearby property, there would be no need to shut down the relevant turbines that otherwise would have caused shadow flicker.		
Decommissioning Phase					
MM63	Decommissioning	Chapter 5:	The mitigation measures outlined in MM58 above will be implemented during the decommissioning phase also.		
ELAR Chapter 6: 'Biodiversity'					

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

			<i>Schemes.</i> Any requirement for piling within 150m of the sett will be restricted to outside of the badger breeding season, as specified in the aforementioned document. A pre-construction badger survey will be carried out to identify the presence of any setts that may have been established in the intervening period, no more than 10 months in advance of construction. If a newly established sett is found within 50m of the Proposed Project footprint, further monitoring and mitigation in line with TII (2005), and in consultation with the NPWS where deemed necessary, will be prescribed as appropriate.		
MM67	Potential Effects on Otter	<i>Chapter 6: 'Biodiversity'</i> <i>Appendix 6-4:</i>	Habitat Loss/Fragmentation, Disturbance, Mortality Although significant impacts are not anticipated, precautionary mitigations are prescribed below: ➤ A pre-commencement survey for otter will be undertaken within 150m upstream and downstream of the proposed new watercourse crossings and crossing upgrades that are required within the Site in advance of commencement of works. ➤ If a holt is found within 150m of construction areas, the works will be undertaken in line with TII (2006)¹ and if a potential for disturbance is identified, these works will not be undertaken until a derogation licence is obtained. The requirement for a pre-construction survey does not represent a lacuna in the survey assessment but is fully in line with industry best practice. The function of the survey will be to assess any changes in baseline conditions since the time of undertaking the baseline surveys. Habitat Degradation (impacts on water quality) Detailed mitigation measures in relation to the protection of surface water during construction is detailed in Chapter 9 of this EIAR.		

¹ TII (2006). *Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes*. Dublin: National Roads Authority.

MM68	Potential Effects on Red squirrel/Pine marten	<i>ELAR Chapter 6</i> <i>Appendix 6-4:</i>	Habitat Loss/Fragmentation No specific mitigation is required for habitat loss. However, as part of the biodiversity enhancement for the Site and as outlined in the BMEP (Appendix 6-4), 2 no. pine marten nest boxes and 2 no. red squirrel nest boxes will be installed within the Site. Indicative locations for installation of the boxes are shown in the BMEP. These have been chosen to suitable habitat for these species within the Site. Disturbance/Mortality A pre-construction survey for pine marten/red squirrel will be carried out to identify the presence of any potential new breeding sites. These surveys will focus on areas of conifer plantation to be felled and all suitable habitat within 50m of the felling footprint. Any potential breeding sites should be monitored to ascertain if they are active breeding sites. Surveys will be undertaken in line with Nature Scot² and TII³ guidelines. Should active dreys/dens be identified within the blocks to be felled, the following mitigations and best practice procedures will be followed to ensure that no breeding site for either red squirrel or pine marten are impacted: ➤ Felling works to be undertaken in October–January inclusive if an active drey or den is found, this will avoid the main breeding season (February–September) when vulnerable young are most likely to be found within breeding sites for both species. ➤ Any breeding sites identified within the 50m buffer that wouldn't be directly affected by felling works but disturbance related impacts will be clearly marked out with an exclusion zone, and works/access through these areas avoided as much as possible. ➤ Plant machinery will be turned off when not in use.		
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² <https://www.nature.scot/sites/default/files/2018-09/Species%20Planning%20Advice%20-%20red%20squirrel.pdf>

³ TII guidance (TII, 2009, *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*. Dublin: National Roads Authority).

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

			Where construction phase lighting is required, a site-specific lighting strategy in line with Section 6.1.2 of Appendix 6-2 will be implemented in accordance with current best-practice guidance to minimise light spill, maintain dark corridors and avoid illumination of retained linear features, sensitive habitats and known roost locations.		
Operational Phase					
MM71	Effects on Aquatic Habitats and Associated Fauna	<i>Chapter 6:</i> <i>Appendix 6-4:</i>	The operational phase drainage system of the Proposed Project will be installed and water will be led via swales to stilling ponds, prior to discharge to ground, therefore, there will be no significant flows or flood risk added to watercourses. Drains, check dams and settling basins will be visually checked and maintained, with vegetation and built-up sediment removed, which will prevent sediment and organic matter being carried to the Licky, Goish and Brickey Rivers. Further detail on the inspection regime can be viewed in Appendix 4-4 of the EIAR. The proposed BMEP measures will reduce existing pressures on freshwater pearl mussel populations such as nutrient input and sedimentation through poaching. Details of the measures and the receiving environments are provided in the BMEP in Appendix 6-4.		
MM72	Potential Effects on Bats During Operation	<i>EIAR Chapter 6</i> <i>Appendix 6-2</i>	Collision Risk Detailed mitigation measures in relation to bats are provided in the Bat Report (see Appendix 6-2) and summarised below. Mitigation measures are proposed together with post-construction monitoring and are summarised as follows: > Introduce felling buffers around turbines > Implement blade feathering as a standard > A minimum of three years operational monitoring (using carcass searching in tandem with activity surveys) to assess changes in bat activity patterns post construction and to monitor the implementation of the mitigation strategy. > Adaptive mitigation strategy based on the results of the post-construction monitoring.		

			Operational Lighting During the operational phase, lighting associated with the Proposed Project will be kept to the minimum necessary for operation, maintenance, safety and security purposes. Turbines will not be continuously illuminated, other than where aviation lighting is required. External lighting associated with the proposed substations and security compounds will be motion-activated and will not be continuously illuminated. Luminaires will be fully shielded, have a 0% upward light ratio and be directed away from retained boundary habitats. All permanent lighting (excluding aviation lighting) will utilise warm-spectrum LED sources with a correlated colour temperature of 3000K or less. Lighting will be designed and operated to maintain dark commuting corridors along retained habitat features and avoid fragmentation of bat commuting routes. A buffer of dark, unlit habitat will be maintained between the proposed substations fence line and the nearest retained treeline or hedgerow. The lighting measures will also follow Dark Sky Ireland principles by ensuring that lighting is used only where necessary, appropriately directed and maintained at the minimum intensity required for operational and safety purposes. With regard to the potential for lighting to increase collision risk, it is noted that there will be limited illumination of the turbines in the form of aviation lighting. Post-construction monitoring will be carried out (as detailed in Appendix 6-2) to assess any potential changes in bat activity patterns and collision risk. Significant effects as a result of lighting are not anticipated; however, if in the course of this monitoring, any potential for significant effects on bats is identified, the site-specific mitigation measures will be reviewed and any changes necessary will be implemented to avoid any such impacts.		
Decommissioning Phase					

MM73	Decommissioning	Chapter 6:	The same mitigation to prevent significant impacts on water quality and associated aquatic fauna and other terrestrial fauna during construction will be required to be implemented during the Decommissioning Phase (See MM64 – MM70 above).		
ELAR Chapter 7: 'Ornithology'					
Pre-Commencement Phase					
MM74	Pre-commencement Surveys	Chapter 7:	A pre-construction bird survey at the Proposed Wind Farm site will be organised to ensure that any sensitive roost or nest sites in the works area are identified and disturbance to these are avoided. Further details are provided in Appendix 7-7: Bird Monitoring and Mitigation Programme of Chapter 7: 'Ornithology'.		
Construction Phase					

MM75	Disturbance to Birds	<i>Chapter 7:</i> <i>Appendix 4-3</i> <i>Appendix 7-7:</i>	A CEMP has been prepared and will be in place prior to the start of the construction phase. Measures specific to birds are detailed below: ➤ Works will commence outside the bird nesting season (1st of March to 31st of August inclusive). ➤ The removal of woody vegetation will be undertaken in full compliance with Section 40 of the Wildlife Act 1976 – 2022. Where sections of woody vegetation are removed for the purposes of the junction and road upgrades, these will be replaced with suitable hedge/tree species which are common in the local context. ➤ Noise limits, noise control measures, hours of operation (i.e. dusk and dawn is high faunal activity time) and selection of plant items will be considered in relation to disturbance of birds. All plant and equipment for use will comply with the European Communities (Noise Emission By Equipment For Use Outdoors) Regulations, 2001, as amended (SI 632/2001). Plant machinery will also be turned off when not in use. ➤ Silt fences will be installed as an additional water protection measure around existing waterbodies. ➤ If winter roosting or breeding activity of birds of high conservation concern is identified, no works shall be undertaken within a species-specific disturbance buffer of the roost/nest, in line with industry best practice (e.g., Goodship and Furness, 2022). No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied.		
Operational Phase					
MM76	Carcass Removal	<i>Chapter 7:</i> <i>Appendix 7-7</i>	To reduce the amount of white-tailed eagle flight activity at the Proposed Wind Farm site and hence reduce the collision risk, a carcass removal programme for fallen animals will be implemented. The proposed protocol which will be undertaken by the site manager to ensure that the Proposed Wind Farm is kept free from carcasses is described below:		

			> Surveys of the wind farm site for carcasses will be undertaken weekly throughout the lifetime of the wind farm. > The site manager will inspect open areas within 100m of turbines. It is proposed that the search area will extend 100m from the turbine base, which exceeds the maximum rotor radius included within the turbine range (75-81m). > Site managers will be trained in the survey methodology, which will include not only the search for fallen animals by sight but also the identification of signs that a carcass may be present but obscured from view. Such signs may include trails of wool/fur or congregations of scavenging species such as hooded crows or ravens. > In addition, the survey can be supplemented by a drone flight to assist in surveying concealed areas of the site. > The fallen animal carcass will be removed from the site on the same day it was located. The removal will be undertaken in compliance with the Department of Agriculture, Food and Marine (DAFM) guidelines. > A log will be kept of the number of carcasses recorded and removed annually. This information will be included in the annual Bird Monitoring report submitted to the planning authority. > Furthermore, the bird surveyors, dog and handler team that will be present onsite undertaking operational monitoring and local farmers will be instructed to report all observations of carcasses to the site manager to arrange for removal. The phone number of the site manager will be provided to all such surveyors visiting the wind farm site		
MM77	White Tailed Eagle Adaptive Mitigation	Appendix 7-7	A detailed mitigation plan for white tailed eagle has been proposed in Appendix 7-7 of the EIAR. The adaptive mitigation measures will be further planned and implemented in consultation with NPWS. The selection and design of the additional mitigation measures will be informed by the monitoring results and will take account of the technologies, guidance and white-tailed eagle population trends prevailing at the time of implementation. These may differ substantially from those available when this plan was prepared. Two potential measures outlined below		

			reflect the current evidence base but may be refined or replaced where more effective approaches become available: > Offsetting collision mortality: Any mortality of white-tailed eagle attributable to the Proposed Wind Farm will be offset through measures intended to increase recruitment into the population associated with the Blackwater River nest. This method is standard practice by the U.S. Fish and Wildlife Service, in which wind energy developers create compensatory mitigation plans as a condition of obtaining a ‘programmatic take’ permit for projects that may occasionally result in eagle collision fatalities. Electricity-transmission and communications infrastructure is identified as a threat to white-tailed eagle in Ireland’s Article 12 Reporting 2013-2018 (EU, 2022). Bird-flight diverters will therefore be installed on overhead power lines up to 5km from the nest to reduce collision risk to the breeding pair and recently fledged juveniles. The nest is the focal point of activity when breeding, and thus where bird flight diverters are most likely to be effective. To ensure the most appropriate locations are chosen, the NPWS will be consulted on the (micro) siting of the proposed bird flight diverters. > Enhanced turbine visibility: Turbine blades will be painted black to increase their contrast against the surrounding environment, thereby enhancing their visibility to white-tailed eagles and reducing collision risk. At Smøla Wind Farm, Norway, where white-tailed eagle collisions were recorded, one blade on each of four turbines was painted black as part of a before-after control-impact experiment, an average 72% reduction in bird fatalities was recorded, with the strongest effect on raptors. No white-tailed eagle carcasses were found after treatment (Kuzovnikova <i>et al.</i>, 2026). > Funding of Research: The developer will provide funding for the purchase of telemetry tags for white-tailed eagle chicks at the Blackwater River nest. Telemetry tags provide valuable information on eagle movements, dispersal, habitat use and survival in Ireland and are routinely deployed on chicks prior to fledging. This information can be used to inform conservation of the species in Ireland. They can also show whether tagged birds enter wind farms and, where altitude data are available, whether they fly at potential collision height. Tags can also indicate the approximate timing and location of a mortality event. Provision will be made for up to two tags over the proposed 35-year operational period of the Proposed Wind Farm, reflecting the		
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			expected number of chicks produced by a successful nesting pair. If tagging at the Blackwater River nest is not possible or appropriate, the tags may be used for chicks at another white-tailed eagle nest within the region. The funding commitment relates solely to the purchase of telemetry tags and does not include the costs associated with fitting the tags, monitoring the birds or managing and analysing the resulting data. Funding will be provided to an appropriate white-tailed eagle research group in consultation with NPWS and subject to the appropriate licencing. The raw telemetry data will be made available for assessment of interactions with wind farms including the Proposed Wind Farm.		
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EIAR Chapter 8: 'Land, Soils & Geology'					
Construction Phase					
MM78	Land Take	<i>Chapter 8:</i>	The Proposed Project has been designed to minimise permanent land-take by optimising the location of turbines and associated infrastructure and, where practicable, utilising existing forestry tracks and disturbed areas. The Proposed 110kV Underground Cabling Route will be installed predominantly within the existing public road corridor, thereby reducing the requirement for permanent occupation of previously undeveloped land. The construction sequence described in Chapter 4: '<i>Description of the Proposed Project</i>', Section 4.7.2 also includes the reinstatement of temporary working areas following completion of the works.		
MM79	Subsoil and Bedrock Excavation	<i>Chapter 8:</i>	The following mitigation measures will be implemented during construction: > Existing forestry roads and access tracks will be upgraded and used where practicable to minimise the extent of new excavation works. > Excavation will be limited to the minimum extent necessary for the construction of the Proposed Project.		

			> Stripped topsoil and subsoil will be stored separately, where appropriate, and reused during reinstatement and landscaping works. > Suitable bedrock extracted from the proposed borrow pits and other infrastructure locations will be processed and reused as construction aggregate within the Proposed Project. > Excavated spoil will be managed in accordance with the site spoil management plan as discussed in MM31 above, including the reinstatement of borrow pit voids, temporary stockpiling where required, and the reuse of suitable material for landscaping and linear berm construction. > Temporary stockpiles will be located, managed and stabilised to minimise erosion and localised instability. > Drainage and sediment-control measures described in Chapter 9, Surface Water Management Plan (SWMP) and the CEMP will be implemented to manage runoff from excavation areas and temporary stockpiles. >		
MM80	Accidental Spills, Leaks or Other Releases	Chapter 8:	The following measures will be implemented during the construction. Hydrocarbons and Chemicals: > The highest standards of site management will be maintained, with the utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the Site and surrounding environment during construction; > An Emergency Response Plan for accidental spillages will be implemented as part of the CEMP. All construction staff will be familiar with the emergency procedures and the use of the relevant equipment; > The ECoW will oversee the pollution prevention measures agreed for the Site to ensure that they are operating safely and effectively, as well as having responsibility for the implementation of Emergency Procedures for spill control measures; > Where possible, refuelling will occur at an off-site controlled fuelling station; > On-site refuelling will be undertaken using a fuel truck, with spill kits readily available for accidental leakages or spillages; > Refuelling will be undertaken by designated, suitably trained personnel only;		

			> Refuelling of construction machinery will take place using drip trays at all times; > All plant and machinery will be serviced before being mobilised on-site and will be regularly inspected and maintained to minimise the risk of leaks and spillages; > Maintenance of construction vehicles or plant will, where practicable, be undertaken off-site; > Spill response kits will be available at all active work areas, refuelling locations, and construction compounds, and personnel will be trained in their use; > Fuels stored on-site will be minimised. Storage areas, where required, will be bunded appropriately for 110% of the fuel storage volume for the time period of construction and fitted with a storm drainage system and an appropriate oil interceptor; and, > All waste tar material arising from the excavation of the 110kV underground cabling trench and resurfacing of roads associated with the Proposed Project will be removed off-site and taken to a licenced waste facility. Cement-based Products: > No batching of wet-cement products will occur on-site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place; > Concrete batching, washdown and washout activities will take place off-site. Concrete works will be managed to prevent accidental releases to soils or surface waters. > Where possible, pre-cast elements for culvert and watercourse crossings will be used; > No washing out of any plant used in concrete transport or concreting operations will be allowed on-site; > Where concrete is delivered on-site, only the chute need be cleaned, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water is to be directed to lined, cement washout ponds before being removed off-site by an appropriately authorised waste collector for disposal at an authorised waste facility. The washout ponds will be covered when not in use to prevent rainwater collecting; > Weather forecasting will be used to assist in planning large concrete pours, and large pours will be avoided where prolonged periods of heavy rain are forecast;		
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			> Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event; and, > At proposed turbine foundations, sand blinding, DPM, and lean-mix blinding are used to vertically contain the concrete. While the concrete is contained laterally by temporary/permanent shuttering. The concrete cures within 72 hrs. Emergency Response Plan Wastewater Management: > During the construction phase, a self-contained port-a-loo with an integrated waste holding tank will be used at each of the site construction compounds maintained by the providing contractor, and removed off-site on completion of the construction works; > Water supply for the on-site office and other sanitation will be brought on-site and removed off-site after use to be discharged at a suitable off-site treatment location; and, > No water will be sourced on-site, nor wastewater discharged on-site. > An Emergency Response Plan for the construction phase to deal with accidental spillages will be included in the CEMP (Appendix 4-3). During the construction phase, a self-contained port-a-loo with an integrated waste holding tank will be used at each of the site construction compounds maintained by the providing contractor, and removed off-site on completion of the construction works; > Water supply for the on-site office and other sanitation will be brought on-site and removed off-site after use to be discharged at a suitable off-site treatment location; and, > No water will be sourced on-site, nor wastewater discharged on-site.		
Operational Phase					
MM81	Operational Effects	Chapter 8:	The following measures will be implemented during operation: > Routine inspection and maintenance of the Proposed Project will be undertaken in accordance with the manufacturer's requirements.		

			> Oils, lubricants and other hazardous materials required during maintenance activities will be appropriately stored, handled and removed off-site following use. > Waste oils and other maintenance wastes will be recorded and removed for reuse, recycling or disposal at an appropriately authorised facility. > Contaminated soil, absorbent materials or other materials arising from an accidental spill will be removed and managed by an appropriately authorised waste contractor. > Transformers and oil-storage tanks within the substations will be provided with concrete bunding capable of containing 110% of the stored oil volume. Turbine transformers will be located within the turbine structures so that any leakage would be contained within the structure and would not discharge directly to the surrounding ground. Any aggregate required for access-road maintenance will be sourced from authorised quarries. No further extraction from the proposed borrow pits will be undertaken during the operational phase.		
Decommissioning Phase					
MM82	Decommissioning	<i>Chapter 8:</i>	The mitigation measures identified for the construction phase (see MM78 – MM80 above) will also be implemented during decommissioning, where relevant. In particular, the measures set out in MM80 for the prevention and management of accidental spills, leaks and other releases will apply to decommissioning activities, including controls relating to refuelling, plant maintenance, storage and handling of fuels and oils, spill response equipment and emergency procedures.		
EIAR Chapter 9: 'Hydrology and Hydrogeology'					
Pre-construction & Construction Phases					
MM83	Felling	<i>Chapter 9:</i> <i>Appendix 4-3</i>	Best practice methods will be incorporated, in accordance with: > DAFM (2019): Standards for Felling and Reforestation.		

		> Coillte (2009): Forest Operations and Water Protection Guidelines. > Coillte (2009): Methodology for Clear Felling Harvesting Operations; Forest Service (Draft). > Forest Service of the Department of Agriculture, Food & the Marine (2008): Forestry and Freshwater Pearl Mussel Requirements – Site Assessment and Mitigation Measures. > Forest Service (2000): Forestry and Water Quality Guidelines. Forest Service, DAF, Johnstown Castle Estate, Co. Wexford. During the Proposed Project construction phase a self-imposed buffer zone of minimum 50 metres will be maintained for natural watercourses where possible. It is proposed that 2.97ha of forestry will be felled within 50m of natural watercourses within the Proposed Wind Farm site. Mitigation measures will be implemented wherever clear-felling is planned. The objective will be to mitigate the risk of mobilising suspended solids and nutrients into drains and surface water courses, as follows in the design stage: > Small felling areas (<25ha), sequencing of felling to avoid intense felling in one subcatchment. > Limiting felling areas and sequencing the felling to avoid intense felling (>25ha) in one subcatchment. > Machine combinations (i.e. handheld or mechanical) will be chosen which are most suitable for ground conditions and which will minimise soils disturbance. > Sediment/Silt traps will be strategically placed downslope within plantation drains near watercourses before ground preparation. The purpose is to slow water flow, increase residence time, and allow settling of silt. No direct discharge of such drains to water courses will occur. > Crossing of watercourses away from bridges and culverts will not be permitted. Checking and maintenance of roads and culverts will be on-going throughout felling activity. No tracking of vehicles through watercourses will occur. Existing interceptor drains will also not be disturbed.		
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			> Clay, soil and silts will be removed from roads during wet periods and dust will be suppressed during dry spells. > Main drains that accommodate the discharge from existing forestry drains will include rock armour, as required, where there are steep gradients. > On steep slopes and where felling inside the 50-metre buffer is required, it will be necessary to install double or triple sediment traps. All drainage channels will taper out before entering the buffer zone. This ensures that discharged water fans out over the buffer zone before entering the aquatic zone, with sediment filtered out by ground vegetation within the zone. > Drains and silt traps will be maintained throughout all felling works, ensuring that they are clear of sediment build-up and are not severely eroded. Machine access will be maintained to enable the accumulated sediment to be excavated. Sediment will be carefully disposed of in the spoil management areas and/or borrow pits. > Correct drain alignment, spacing and depth will ensure that erosion and sediment build-up are minimized and controlled. > Branches, logs or debris will not be allowed to build up in aquatic zones. All such material will be removed when harvesting operations have been completed, but care will be taken to avoid removing natural debris deflectors. > Extraction tracks near drains need to be broken up and diversion channels created to ensure that water in the tracks spreads out over the adjoining ground. Culverts on drains exiting the Site will be unblocked. > Brash mats will be used to support vehicles on soft ground, reducing soil erosion and avoiding the formation of rutted areas. Brash mat renewal will take place when they become heavily used and worn. Provision will be made for brash mats along all off-road routes, to protect the soil from compaction and rutting. Where there is risk of severe erosion, extraction will be suspended during periods of high rainfall. > Timber will be stacked in dry areas and outside the hydrological buffer zones. > Works will not be conducted during significant rainfall events (see MM84) in order to minimise entrainment of exposed sediment in surface water run-off. > Branches, logs or debris will not be allowed to build up in aquatic zones. All such material will be removed when tree-felling operations have been completed. > Refuelling or maintenance of machinery will not occur within 50m of a watercourse. Mobile bowser, drip kits, qualified personnel will be used where refuelling is required.		
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			> A permit to refuel system will be adopted. The following items will be conducted in relation to drain inspection and maintenance during pre-felling inspections and after: > Communication with tree felling operatives in advance to determine whether any areas have been reported where there is unusual water logging or bogging of machines (i.e., hot spot areas). > Inspections of plant and machinery will be conducted prior to any works to assure all are in good condition. > Inspection of drainage ditches and outfalls. During pre-felling inspections, the main drainage ditches will be identified. The pre-felling inspection will be conducted during rainfall events. > Following tree felling, all main drains will be inspected to ensure that they are functioning. > All accumulated silt will be removed from drains and culverts, and silt traps, and this removed material will be deposited away from watercourses to ensure that it will not be carried back into the trap or stream during subsequent rainfall.		
MM84	Earthworks	<i>Chapter 9:</i> <i>Appendix 4-3</i>	There will be no stockpiling of excavated material within 50 m of any natural water courses or within 10 m of any drainage features on the Site. Due to the overland flow observed in the fields around T12 and the proximity of the area to the River Licky, there will be no local stockpiling of material around T12 as illustrated in Figure 9-22 of Chapter 9 of the EIAR. Earthworks will not be conducted during significant storm events. The works programme for the entire construction stage of the Proposed Project will take account of weather forecasts, notably predicted rainfall. Large excavations and movements of soil/subsoil or vegetation stripping will be scaled back or suspended if heavy rain is forecast. Threshold rainfall values will serve to guide decisions to suspend works, visually and/or judged from weather forecasting, by either of the following: > High-intensity rainfall events, >10 mm/hr.		

			> Heavy frontal rainfall lasting most of the day, >25 mm in a 24-hour period. > More than half the monthly average rainfall over 7 days. The ECoW is responsible for the checking and communication of weather forecasts as outlined in the CEMP. Prior to suspending works for climatic reasons, the following control measures will be completed: > Open excavations will be secured. > Temporary or emergency drainage will be provided to prevent back-up of surface runoff in work areas. > Working for up to 12 hours after heavy rainfall events will be avoided to ensure drainage systems are not overloaded. Decisions are subject to visual inspection and judgement by ECoW. The intent and objective is to control erosion, avoid collapses of embankments, and limit the mobilisation and transport of sediments. Key mitigation by design measures that will be implemented comprise source controls, in-line controls and treatment systems, as follows: > Source control measures cover working areas, staging areas and stockpiles. Methods that will be employed are diversion drains, flume pipes, sandbags, oyster bags filled with gravel, and filter fabrics. Flexibility to adapt methods will be required based on location-specific conditions, as judged by supervising engineers or the ECoW from visual inspection. > In-Line controls involve settling of suspended sediments and particulate organic matter with the use of silt fences, sand or oyster bags, weirs, baffles, and check dams. Flow limiters and sump pumping systems may be employed where needs arise in order to maintain the hydraulic functioning of the existing drain system. > Treatment systems involve sediment traps and temporary sumps/attenuation ponds. > Treatment systems involve sediment traps and temporary sumps/attenuation ponds. > If discharge water fails to be of a high quality during regular inspection, then a filtration treatment system will be used to filter discharge water before release to water courses. This applies for the entire construction phase. Particular care will be taken during any such application near receptor water bodies as certain chemical used for		
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			flocculation can affect the pH of watercourses. Manufacturers will be consulted prior to the potential use of filtration treatment systems, to ensure the application will not have negative effects on receptor water quality. ➤ For discharges near water courses, within the 50 m buffer, double silt fences will be employed. These will be inspected, maintained, and remain in place throughout the entire construction phase. ➤ Silt bags will be used where small to medium volumes of water need to be pumped from excavations. As water is pumped through the bag, the majority of the sediment is retained by the geotextile fabric allowing filtered water to pass through. Silt bags will be used with natural vegetation filters or sedimats. ➤ Sediment entrapment mats, consisting of coir or jute matting, will be placed at the silt bag location to provide further treatment of the outfall from the silt bag. Sedimats will be secured to the ground surface using stakes/pegs. Sedimats will extend the full width of the outfall to ensure all water passes through this additional treatment measure. Level spreaders will be designed for each outfall. Stockpiles will be progressively covered or sealed with the excavator bucket during stockpiling, and covers will be secured once a stockpile has reached capacity. It is proposed that excavated spoil will be used for landscaping where required. The excess material will be used for backfilling the borrow pits and roadside linear berms within the Site. Excavated ‘clay pan’ material will only be used for the backfilling of borrow pits. Construction works will be sequenced to ensure borrow pit(s) will be available for backfilling before ‘clay pan’ material is excavated. ➤		
MM85	Watercourse crossings	<i>Chapter 9:</i> <i>Appendix 4-3:</i>	Direct in-stream works will not be required. All works will be conducted in accordance with the CEMP which incorporates the best practice IFI “Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters” (IFI, 2016). Related activity incorporates many of the same measures that are presented in MM84 above. Additionally, the following measures will be implemented:		

			> All new stream crossings within the Proposed Wind Farm site will be bottomless-box culverts or clear-span crossings. Existing banks will remain undisturbed. Abutments will be constructed from precast units combined with in-situ foundations. > All guidance / mitigation measures required by the OPW and/or the Inland Fisheries Ireland (IFI) is incorporated into the design of the proposed crossings; > Plant and equipment will not be permitted to track across the watercourse; > Once the foundations have been completed at both sides of the watercourse, the pre-cast concrete box culvert will be installed using a crane and there will be no contact with the watercourse; > Where a box culvert is installed in sections, the joint will be sealed to prevent granular material entering the watercourse; > During near-stream construction works, double-row silt fences will be emplaced immediately downgradient of work areas for the duration of activity. > In accordance with IFI (2016), any near-stream works will be undertaken from July to September inclusive, i.e., the relatively drier summer period. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses. Any deviation that may be temporarily necessary will be done in discussion with the IFI. > All new river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent (Arterial Drainage Act, 1945). Underground cabling routes within the Site (e.g., from turbines) will follow new or existing access roads, and cables will pass within the structure of the road and associated culverts, with no interaction with the watercourse.		
MM86	Cable works installation	Chapter 9:	Cable trenches will be constructed in short, controlled sections, minimising the amount of ground disturbed at any one time. This minimises the potential for drainage runoff and silt or suspended solids to enter water courses. Each short section of trench is excavated, ducting installed and bedded, and backfilled with the appropriate materials, before work on the next section commences. In-stream works will be avoided in all cases. Detailed method statements will be prepared and implemented by contractors, which will incorporate		

			measures to protect watercourses from potential discharges of sediment, drilling fluids, fuel spills. > Excavated material is stored on the up-gradient side of the trench and is temporarily sealed/smoothed over, using the back of the excavator. > Material stockpiles should be stored at least 50m back from drains and watercourses on level ground with a silt fence inserted at the base to prevent runoff. > Silt fences will be installed temporarily downgradient of the cable trench works area. > Excess subsoil is removed from the cable trench works area immediately upon excavation, and in the case of the Proposed Project, will be transported to one of the void borrow pits or used for landscaping and reinstatement elsewhere on-site or a nearby, licenced waste facility. > Trench supports will be installed, or the trench sides will be benched or battered back where appropriate, and any ingress of ground water will be removed from the trench using submersible pumps, fitted with appropriate silt filtration systems, to prevent contamination of any watercourse. > Ground water and surface water accumulating in the base of trenches will not be pumped directly to roadside drains or watercourses unless it is clean and free from solids.		
MM87	Dewatering and pumping from open excavations	Chapter 9:	Pumping of water from excavations will be necessary, so localised and temporary groundwater lowering cannot be avoided if or where it is implemented. Quantities will be small given the generally low-permeability characteristics of both the till and the bedrock groundwater flow system. Additionally, excavations will remain relatively shallow and most turbine bases and proposed borrow pits are located in elevated areas near hilltops. Pumping and water management is a matter of routine for contractors familiar with this type of development and activity. No direct discharges to streams will be permitted, and this will be enforced by the ECoW. All pumped water must be led and pass through a suitably sized stilling pond prior to diffuse discharge to ground or a drain away from the excavation location. The water to be pumped, which contains suspended solids, will be collected in sumps, pumped out, and led to associated settling ponds which will be established in the first stage		

			of construction. The purpose is to facilitate the settling out of fine sediments prior to subsequent discharge. The water will be pumped and discharged periodically, on as-needed basis. It is not a continuous process, and quantities pumped will vary from location to location, and seasons. Best practice methods will be applied to prevent accidental pollution of the water in open excavations, as described in MM84.		
MM88	Accidental spills, leaks or other releases	<i>Chapter 9:</i> <i>Appendix 4-3:</i> <i>Appendix 4-4:</i>	The prevention of, and responses to, accidental spills and leaks of fuel and other chemicals are covered by the CEMP and SWMP. The following mitigation measures will be implemented. ➤ An Emergency Response Plan for accidental spillages will be implemented as part of the CEMP. All construction staff will be familiar with the emergency procedures and the use of the relevant equipment; ➤ Emergency Response PlanThe ECoW will oversee the pollution prevention measures agreed for the Site to ensure that they are operating safely and effectively as well as having responsibility for the implementation of Emergency Procedures for spill control measures. ➤ Where possible, refuelling will occur at an off-site controlled fuelling station. ➤ On-site refuelling will be undertaken using an offsite fuel truck, with spill kits readily available for accidental leakages or spillages; ➤ Refuelling will be undertaken by designated, suitably trained personnel only; ➤ Refuelling of construction machinery will take place using drip trays at all times; ➤ All plant and machinery will be serviced before being mobilised on-site and will be regularly inspected and maintained to minimise the risk of leaks and spillages; ➤ Maintenance of construction vehicles or plant will, where practicable, be undertaken off-site; ➤ Spill response kits will be available at all active work areas, refuelling locations, concrete works and construction compounds, and personnel will be trained in their use; ➤ Fuels stored on-site will be minimised. Storage areas, where required, will be bunded appropriately for 110% of the fuel storage volume for the time period of construction and fitted with a storm drainage system and an appropriate oil interceptor;		

			> All waste tar material arising from the excavation of the 110kV underground cabling trench and resurfacing of roads will be removed off-site and taken to a licenced waste facility; > An Emergency Response Plan for the construction phase to deal with accidental spillages will be contained within the Construction Environmental Management Plan. > Hydrocarbon interceptors will be installed at the substations and construction compounds.		
MM89	Release of cement-based products	Chapter 9:	> No batching of wet-cement products will occur on-site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place; > Where possible, pre-cast elements for culvert and watercourse crossings will be used; > No washing out of any plant used in concrete transport or concreting operations will be allowed on-site; > Where concrete is delivered on-site, only the chute need be cleaned, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water is to be directed to lined, cement washout ponds before being removed from the Site and discharged at a suitable licensed facility; > The washout ponds will be covered when not in use to prevent rainwater collecting. > Weather forecasting will be used to assist in planning large concrete pours, and large pours will be avoided where prolonged periods of heavy rain are forecast.; and, > Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event; and > At proposed turbine foundations, sand blinding, DPM, and lean-mix blinding are used to vertically contain the concrete. While the concrete is contained laterally by temporary/permanent shuttering. The concrete cures within 72hrs. Risks of pollution will be further reduced as follows: > Concrete will not be transported around on-site in open trailers or dumpers to avoid spillage while in transport.		

			> Arrangements for concrete deliveries on-site will be discussed with suppliers before work starts, routes will be confirmed, and on-site washouts will be prohibited, and emergency procedures will be discussed. > Clearly visible signage will be placed in prominent locations close to concrete pour areas specifically stating washout of concrete lorries is not permitted on-site. > Excavations will be sufficiently dewatered before concreting begins, and dewatering will continue while concrete sets. > Covers will be used on freshly placed concrete to avoid the surface washing away in heavy rain. > Any potential, small surplus of concrete will be disposed of after completion of a pour in suitable locations away from any watercourse or sensitive habitats.		
MM90	Piling Works	Chapter 9:	Proposed mitigation measures relative to piling works will comprise: > Strict QA/QC procedures for piling works will be followed; > Piles will be kept vertical during piling works; > Good workmanship will be employed during all piling works; and, > Where required use bentonite seal to prevent upward/downward movement of surface water/groundwater.		
MM91	Wastewater management	Appendix 4-3: Chapter 9:	> During the construction phase, a self-contained port-a-loo with an integrated waste holding tank will be used at each of the proposed construction compounds (and along the Proposed 110kV Underground Cabling Route as required), maintained by the providing contractor, and removed off-site on completion of the construction works; > No water or wastewater will be sourced on the Site, nor discharged to the Site.		
Operational Phase					
MM92	Groundwater abstraction	Chapter 9:	> Rainwater will be harvested, if possible, to reduce the need for groundwater pumping. > Should a well be installed at either substation, the volumes of groundwater that would be pumped are small, <2 m³/d. The pumping would be intermittent. The hydraulic		

			influence of pumping would be localised and would not result in any significant reduction in groundwater levels or natural groundwater baseflow to watercourses.		
MM93	Wastewater management	<i>Chapter 9:</i>	> The proposed wastewater holding tanks will be fitted with an automated alarm system that will provide sufficient notice that the tank requires emptying. Full details of the proposed tank alarm system will be submitted to the Planning Authority in advance of any works commencing on-site. > Only waste collectors holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007 (as amended), will be employed to transport wastewater off-site.		
Decommissioning Phase					
MM94	Decommissioning Phase	<i>Chapter 9:</i>	> Mitigation measures to avoid contamination by accidental fuel leakage and compaction of soil by on-site plant will be implemented as per the construction phase mitigation measures. > Decommissioning will be undertaken in accordance with the Decommissioning Plan, relevant environmental legislation, guidance and best practice, and the Plan will be reviewed/updated before decommissioning.		
ELAR Chapter 10: 'Air Quality'					
Construction Phase					
MM95	Exhaust Emissions (Construction of Proposed Project Infrastructure, Transport to	<i>Chapter 10:</i>	> Proposed Project Construction staff will be trained how to inspect and maintain construction vehicles and plant to ensure good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager will produce and follow a site inspection and machinery checklist which will be followed and updated as required. > All plant and materials vehicles shall be stored in dedicated areas (onsite). Machinery will be switched off when not in use.		

	and from the Site)		> Turbines and construction materials will be transported to the site on specified routes only, unless otherwise agreed with the Planning Authority. Please see Chapter 15: 'Material Assets' for details. > Areas of excavation will be kept to a minimum, and stockpiling of excavated material will be minimised by coordinating excavation, placement of material in borrow pits. > The expected waste volumes generated onsite will not be large enough to warrant source segregation at the Site. Therefore, all wastes streams generated onsite will be deposited into a single waste skip which will be covered. This waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. > The MRF facility will be local to the Site to reduce the emissions associated with vehicle movements. > Aggregate materials for the construction of the Proposed Project will be mainly sourced from the on-site borrow pits and other infrastructure excavations, with only small amounts suitable material being sourced from local quarries.		
MM96	Dust Emissions (Construction of Proposed Project Infrastructure)	<i>Chapter 10:</i> <i>Appendix 4-3:</i>	> Groundworks (i.e. works with potential to create dust) associated with the Proposed Project will be fully supervised by an ECoW. > The ECoW will have power to halt construction works if required. > Sporadic wetting of loose stone surface will be carried out during the construction phase to minimise movement of dust particles to the air. In periods of extended dry weather, dust suppression may be necessary along haul roads to ensure dust does not cause a nuisance. Water bowser movements will be carefully monitored by the ECoW to avoid, insofar as reasonably possible, increased runoff. > All plant and materials vehicles shall be stored in dedicated areas within the Site. > Areas of excavation will be kept to a minimum, and stockpiling of excavated material will be minimised by coordinating excavation, placement of material in borrow pits > Turbines and construction traffic will be transported to the Site on specified haul routes only. > The agreed haul route road adjacent to the Site will be regularly inspected for cleanliness and cleaned as necessary.		

			> The roads adjacent to the Site proposed new entrance will be checked weekly for damage/potholes and repaired as necessary. > If necessary, excavated material will be dampened prior to transport to the borrow pits. > Waste material will be transferred to a licensed/permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF facility will be local to the Proposed Project to reduce the amount of emissions associated with vehicle movement. > Inspection of stockpiles, reinstated borrow pits, and landscaping areas will be made by the ECoW through regular monitoring of the works.		
MM97	Dust Emissions (Transport to and From the Site)	<i>Chapter 10:</i> <i>Appendix 4-3:</i>	> Sporadic wetting of loose stone surface will be carried out during the construction phase to minimise movement of dust particles to the air. In periods of extended dry weather, dust suppression may be necessary along haul roads to ensure dust does not cause a nuisance. Water bowser movements will be carefully monitored by the ECoW to avoid, insofar as reasonably possible, increased runoff. > All plant and materials vehicles shall be stored in dedicated areas within the Site. > Turbine components and construction materials will be transported to the Proposed Wind Farm on specified haul routes only, as agreed with the local authority. > Construction materials for the Proposed Project will be sourced locally from the onsite borrow pits. > The agreed haul route roads adjacent to the Site will be regularly inspected for cleanliness and cleaned as necessary. > The roads adjacent to the Site entrances will be checked weekly for damage/potholes and repaired as necessary. > The transport of construction materials around the onsite borrow pit will be covered by tarpaulin where necessary. > Waste material will be transferred to a licensed /permitted MRF by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. > The MRF facility will be local to the Site to reduce the amount of emissions associated with vehicle movements		

Operational Phase					
MM98	Exhaust Emissions	Chapter 10	> Any vehicles or plant brought onsite during the operational phase will be maintained in good operational order that comply with the Road Traffic Acts 1961 as amended, thereby minimising any emissions that arise. > When stationary, delivery and onsite vehicles will be required to turn off engines. > The MRF facility will be local to the Site to reduce the emissions associated with vehicle movements.		
Decommissioning Phase					
MM99	Decommissioning	Chapter 10: Appendix 4-6:	The mitigation measures prescribed for the construction phase of the Proposed Project (MM95 – MM97) will be implemented during the decommissioning phase thereby minimising any potential effects.		
ELAR Chapter 11: 'Climate'					
Construction, Operational & Decommissioning Phases					
MM100	Greenhouse Gas Emissions	Chapter 11:	Mitigation measures applied during construction activities will be similar to those applied during construction where relevant and are outlined in MM95–MM98.		
ELAR Chapter 12: 'Noise & Vibration'					
Construction Phase					

MM101	Construction Phase Noise (General)	Chapter 12:	The following list of measures will be considered, where necessary, to ensure compliance with the relevant construction noise criteria: > Limiting the hours during which site activities likely to create high levels of noise or vibration are permitted; > Establishing channels of communication between the contractor/developer, Local Authority and residents; > Monitoring typical levels of noise and vibration during critical periods and at sensitive locations; > Selection of plant with low inherent potential for generation of noise and/ or vibration where practical; > Placing of noise generating / vibratory plant as far away from sensitive properties as practical within the site constraints, and; > The hours of construction activity will be limited to avoid unsociable hours where possible. Construction operations shall generally be restricted to between 7:00hrs and 19:00hrs Monday to Saturday. However, to ensure that optimal use is made of good weather periods or at critical periods within the programme (i.e. concrete pours, turbine component deliveries) it could occasionally be necessary to work out of these hours. Where potential temporary exceedances are predicted at the nearest receivers, the following mitigation measures are proposed to reduce noise impacts during the activities: > Orientating plant to minimise the noise impact on nearby receptors where practicable, > Erection of temporary localised mobile noise screens where practicable around activities, > Phasing of work and reduce percentage on time to lower the noise impact.		
MM102	Construction Phase Noise (Blasting)	Chapter 12:	Air overpressure from a blast is difficult to control, however, because of its variability much can be done to reduce the effect. A reduction in the amount of primer cord used, together with the adequate burial of any that is above the ground, can give dramatic reduction to air		

			overpressure intensities especially in the audible frequency range. Most complaints are likely to be received from an area downwind of the blast site, and therefore, if air blast complaints are a continual problem, it would be advisable to postpone blasting during unfavourable weather conditions if possible. As air blast intensity is a function of total charge weight, then a reduction in the total amount of explosives used can also reduce the air overpressure value. Further guidance will be obtained from the recommendations contained within BS 5228: Part 1 and the European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations 1988 in relation to blasting operations. The methods used to minimise impacts will consist of the following: > Restriction of hours within which blasting can be conducted (e.g. 09:00 – 18:00hrs). > The firing of blasts at similar times to reduce the ‘startle’ effect. > On-going circulars informing people of the progress of the works. > The implementation of an onsite documented complaints procedure. > The use of independent monitoring for verification of results. Trial blasts in less sensitive areas to assist in blast designs and identify potential zones of influence.		
Operational Phase					
MM103	Wind Turbine Noise	<i>Chapter 12:</i>	Mitigation in the form of turbine curtailment can ensure the residual turbine noise levels will be within the turbine noise criteria in specific wind conditions (i.e., wind speed and direction). To address the potential exceedances predicted, the V150 6MW and the V162 7.2MW turbines in this assessment can be programmed to operate in low noise modes for specific wind speed bins and periods. The V150 6MW, and V162 7.2MW turbines can be configured for up to 6 and 5 different operating modes respectively; all modern wind		

			turbines will have similar controls to reduce the noise emission of the turbine in certain conditions.		
MM104	Amplitude Modulation and Tonality	Chapter 12:	> In the event that a complaint which indicates potential excessive amplitude modulation (AM) associated with the proposed project, the operator will fully investigate the complaint in collaboration with the turbine manufacturer, through review of the meteorological periods and conditions during which the reported AM occurs. If an ongoing issue with excessive AM is identified, a mitigation strategy to reduce the level of AM will be implemented through engineering methods and/or curtailment of specific turbines. The operator may appoint a qualified acoustic consultant to objectively assess the level of AM in accordance with the methods outlined in the IOA AMWG or subsequent revisions. > The measurement method outlined in the IOA AMWG document, known as the 'Reference Method', will provide a robust and reliable indicator of AM and yield important objective information on the frequency and duration of occurrence, which can be used to evaluate different operational conditions including methods to mitigate any excessive AM. These mitigation measures, if required, will consist of the implementation of operational controls for the relevant turbine type, which will include turbine curtailment under specific operational conditions and may in very unlikely circumstance require turning specific turbine off under certain conditions. To minimise adverse impacts from excessive AM associated with the proposed project. > If the complaints suggest the potential occurrence of clearly audible tonality in the wind turbine noise, the audibility of the tones will be investigated from measured data with a robust, objective method such as that included in ISO 1996-2:2017 with modifications in IEC 61400-11-2. If the rated level of the wind farm is above the limit, then the operator would liaise with the turbine manufacturer to investigate and implement measures to reduce the rated level to below the limit. This may involve engineering methods, operational changes and/or (in very unlikely circumstance) curtailment of specific turbines. > The commitment outlined to control amplitude modulation (AM) from wind turbines are considered best practice. The proposed approach will ensure that any adverse		

			impacts from excessive amplitude modulation (AM) associated with the operation of the proposed project are effectively managed by the operator		
MM105	Fixed Plant	<i>Chapter 12:</i>	The assessment of noise from the operation of fixed plant at the Proposed 110kV Substation and the Proposed 220kV Loop-in Substation are predicted to comply with the proposed criteria in Section 12.3.6. Therefore, no specific mitigation measures are required. However, as the design is progressed the following measures will be considered to ensure the noise levels at NSL are within the proposed criterion and the potential for noise disturbance is minimised: > all mechanical plant items e.g. fans, pumps etc. shall be regularly maintained to ensure that excessive noise generated and any worn or rattling components is minimised; > any new or replacement mechanical plant items, including plant located inside, shall be designed so that all noise emissions from site do not exceed the noise limits; there are no tonal or impulsive characteristics from the plant operation audible at any NSL during night time periods.		
Decommissioning Phase					
MM106	Decommissioning	<i>Chapter 12: Appendix 4-6</i>	The contract documents will specify that the Contractor undertaking the decommissioning works will be obliged to adopt best practice noise abatement measures contained in British Standard BS 5228-1:2009+A1:2014 ‘Code of practice for noise and vibration control on construction and open sites – Noise’ and BS 5228-2:2009+A1:2014 ‘Code of practice for noise and vibration control on construction and open sites – Vibration’. To ameliorate any potential noise impacts that may be present during the decommissioning phase, a schedule of noise control measures has been formulated in accordance with best practice guidance. These are outlined in the MM101 above.		
EIAR Chapter 13: ‘Landscape & Visual’					
Construction and Operational Phases					

MM107	Mitigation by Siting	Chapter 13:	The Proposed Wind Farm site was strategically selected as a landscape highly suitable for the wind energy development. Through the iterative project design process, various best practice tools for assessing the landscape and visual impact of a proposed wind farm development were utilised to bring forward the optimum design for the Proposed Wind Farm with respect to landscape and visual factors. These tools include landscape modelling, ZTV mapping and the preparation of photomontage visualisations.		
MM108	Mitigation by Design	Chapter 13:	> Minimised Impact on Scenic Route Sensitivities designated in Local Policy: The Proposed Turbines are strategically sited in locations that do not interfere, obstruct or significantly impact any of the scenic long-ranging landscape views from nearby designated scenic routes > Appropriate Siting and Design for Landscape Character Type in the Guidelines (DoEHLG, 2006) and Draft Guidelines (DoHPLG, 2019). The Proposed Turbines are sited on a mix of ridges and hillslopes, arranged in multiple clusters with irregular spacing of turbines and an appropriately staggered, linear layout with a range of turbine heights that follows the highly undulating terrain, and are sufficiently distanced from cumulative developments and enclosed visually by the terrain such that the potential for in-combination visibility with cumulative developments is minimised, thereby aligning with best practice siting and design for wind energy developments in the Transitional Marginal landscape character type. > Strategic Siting of Proposed Turbines on Elevated Ridgelines: In line with best practice siting and design guidance of wind farms in the Guidelines (DoEHLG, 2006) and Draft Guidelines (DoHPLG, 2019), the Proposed Turbines are strategically sited on ridges and peaks within the Transitional Marginal landscape character type to achieve clear visual separation between the moving turbine components and the visual complexity of lower ground. > Mitigation for Proposed 110kV Substation. The Proposed 110kV Substation is strategically sited in a compound at lower elevation relative to the adjacent scenic route and residential receptors and which is set within a block of forestry to reduce to potential for visual effects. > Mitigation for Proposed 220kV Loop-in Substation: The Proposed 220kV Loop-in Substation is located in an agricultural landscape that slopes downwards from the		

			northeast and is naturally bounded by mature trees and hedgerows between fields, an area with very few receptors and thereby minimal potential to give rise to landscape and visual effects, especially when viewed from the northwest. LVIA mitigation includes replanting of hedgerows required to be removed as part of the construction works as well as placement of berms with planting along the northwest perimeter of the proposed compound and bolstering of the existing hedgerow with semi-mature vegetation which will further mature over time, to ensure sufficient screening, proposed as part of the design in conjunction with local community consultation. > Pro-active Biodiversity Enhancement Measures: The Proposed Project includes specific pro-active biodiversity enhancement and management measures and interventions to improve the ecological value of the landscape at the Proposed Wind Farm site, including new hedgerow and native woodland establishment within the Proposed Wind Farm and construction of berms/embankments around the infrastructure to facilitate pollinator habitats which have the dual effect of providing localised visual screening, these measures are detailed in the Biodiversity Management and Enhancement Plan in Appendix 6-4 and effects of the Proposed Project on biodiversity and ecology are assessed in the EIAR Chapter 6: ‘<i>Biodiversity</i>.’ > Proposed 110kV Underground Cabling Route: The intended connection to the national electricity grid is underground, thereby eliminating potential landscape and visual effects during the operational phase on receptors of the route which includes users of the public roadway.		
MM109	Landscape Effects	Chapter 13:	The following measures should be implemented to mitigate landscape effects during the construction phase of the Proposed Project: > In all circumstances, excavation depths and volumes will be minimised, and excavated material will be re-used where possible. > For the Proposed 110kV Underground Cabling Route, where the cable trench is to be located in the road verge, subsoil will be temporary-stored on-site and re-used for re-instatement after cabling works. Should any medium planting be removed, it should be replaced with the same or similar species whenever it is not possible to salvage and reinstate.		

			➤ Any areas of bare soil remaining after the landscaping phase will be seeded as soon as possible with a grass-seed mix to minimise sediment run-off.		
MM110	Visual Effects	Chapter 13:	➤ General housekeeping measures, necessary for Health & Safety requirements, will ensure that the active construction areas will be kept tidy, mitigating localised visual impacts during the Construction Phase. ➤ The location of construction works primarily within forestry blocks in undulating terrain ensures that most construction works will be screened from view either by forestry, topography, or a combination of both. In the event that forestry is felled prior to construction, visibility will be limited by dense or intermittent roadside screening along most roads within the Proposed Wind Farm site		
EIAR Chapter 14: 'Archaeological, Architectural and Cultural Heritage'					
Pre-Construction, Construction and Operational Phases					
MM111	Sub-surface Archaeological Potential	Chapter 14: Appendix 4-3:	Pre-development testing, under licence from the NMS, will be carried out. Testing will only be undertaken in areas where ground disturbance will take place as part of the Proposed Project. The areas to be tested will be chosen by the appointed archaeologist and the number of test trenches agreed between the archaeologist and the NMS through the licensing system. A report on the testing will be compiled on completion of the work. Should archaeological finds, structures or deposits be uncovered as a result of the testing further mitigation measures such as preservation in situ or preservation by record (excavation) may be required and will be decided in consultation with the NMS. Such mitigation measures will be implemented, where relevant, following consultation with the NMS. The location of any potential Cultural Heritage features therein will be recorded and a photographic record made of same. A report on the results of the walk-over survey will be compiled on completion of same and will include any further required mitigation measures such as buffer zones, etc, deemed necessary.		
EIAR Chapter 15: 'Material Assets'					

Material Assets - Traffic					
Construction Phase					
MM112	Traffic Management Plan	Chapter 15: Appendix 15-3:	A Construction Traffic Management Plan (TMP) will be prepared and implemented for the Proposed Project. The TMP will be finalised by the appointed contractor in consultation with Waterford City and County Council and, where necessary, An Garda Síochána, prior to commencement of construction works. The TMP will identify measures to reduce the number of construction vehicles, as well as measures to mitigate the impact of vehicles. The TMP will identify the programme of works, the agreed routes to Site and details of a Site Liaison Officer who will have responsibilities for managing traffic and transport impacts and effects. The TMP will also identify measures to reduce and manage construction staff travel by private car, particularly single occupancy trips. Measures provided in the TMP could include (but are not limited to); > Details of the construction programme and construction traffic types and volumes per months of the construction programme; > Details of site working hours; > No routine HGV deliveries will be scheduled during weekday network peak periods or local school start and finish periods, unless otherwise agreed in advance with Waterford City and County Council and An Garda Síochána; > Approved haul routes would be identified and protocols put in place to ensure that HGVs adhere to these routes; > Details of access arrangements for all deliveries, operatives and visitors to the Site will be specified, including parking arrangements; > Details of logistics infrastructure such as unloading areas, welfare facilities, car parking and storage compounds; > All contractors would be provided with a site induction pack containing information on delivery routes and any restrictions on routes;		

			> All Site visitors will undergo a Site induction covering Health and Safety issues at the Contractor's temporary compound and will be required to wear appropriate Personal Protective Equipment (PPE) while onsite; > All contractors would be required to give details of proposed timing of material deliveries to the Site and would be given a specific area for delivery; > The construction material 'lay down' areas would allow for a staggered delivery schedule throughout the day, avoiding peak and unsociable hours (i.e. before 6am and after 10pm); > Under no circumstances would HGVs be allowed to lay-up on surrounding roads; > Details of the site liaison would be provided to all relevant stakeholders; > Temporary construction site signage would be erected along the identified construction traffic routes in accordance with the 'Traffic Signs Manual, Section 8 – Temporary Traffic Measures and Signs for Road Works' and 'Guidance for the Control and Management of Traffic at Roadworks'; > The TMP will include specific measures for delivery of turbine components via abnormally large vehicles including details of a trial run using vehicles with similar dimensions at dates and times agreed with the relevant authorities; > Abnormal load deliveries will be undertaken outside peak traffic periods and subject to detailed delivery scheduling, escort arrangements and advance stakeholder notification procedures; > Temporary traffic management measures associated with the Proposed Project including the Proposed 110kV Underground Cabling Route works will be agreed with Waterford City and County Council in advance of construction and will maintain access to properties, farms and emergency services insofar as reasonably practicable; > All personnel in the team would be in contact with each other and with Site management, who in turn would have mobile and telephone contact with the subcontractors; > The TMP and the control measures therein would be included within all trade contractor tender enquiries to ensure early understanding and acceptance/compliance with the rules that would be enforced on this project; > Measures to maintain roads in a clean and safe condition such as sheeting of vehicles and wheel washing and/or road cleaning measures as appropriate; and		
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			> A pre and post construction inspection of the roads would be carried out and their condition recorded. Timings would be agreed with the relevant authorities. The TMP would ensure that there is signage along the construction routes to make residents aware of the additional HGV traffic and to provide the opportunity to plan ahead. The TMP would ensure that construction HGVs do not travel during peak periods or at the start/end of the school day and that they adhere to a lowered speed limits if applicable. Each of these measures would contribute to minimising the level of effect experienced by local residents and road users.		
Decommissioning Phase					
MM113	Traffic Management	Chapter 15:	> Traffic associated with the decommissioning phase would be lower than during construction and would be subject to similar traffic management control measures (see MM112 above)		
Material Assets - Other					
Construction and Operational Phases					
MM114	Telecommunications	Chapter 15:	Prior to the operational phase of the Proposed Wind Farm, a testing exercise will be carried out to determine there are no impacts on any radio links which traverse the Proposed Wind Farm site. It is anticipated that the 2 ESB links with potential to be affected by the Proposed Turbines. Both ESB links are proposed to be relayed via the proposed telecommunications relay mast. A TV reception survey will be undertaken prior to the commencement of construction works on the Proposed Turbines (and subsequently post commissioning of the Proposed Turbines) in order to accurately predict the number of households which will be affected by the operation of the Proposed Turbines. Should any houses require remediation the following measures may be required: > Redirect viewers receiving antennas to an alternative Saorview transmission site.		

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

			with overhead lines. All contractors that may visit the sites are made aware of the location of lines before they come on to site. > Barriers will run parallel to the overhead line at a minimum horizontal distance of 6 metres on plan from the nearest overhead line conductor wire. > Prior to the delivery of turbines to the Proposed Wind Farm site, a dry run of the route using vehicles with similar dimensions will occur. > When activities must be carried out beneath overhead lines, e.g. component delivery or grid cable laying, a site-specific risk assessment will be undertaken prior to any works. The risk assessment must take into account the maximum potential height that can be reached by the plant or equipment that will be used is undertaken prior to any works. Overhead line proximity detection equipment will be fitted to machinery when such works are required. > Information on safe clearances will be provided to all staff and visitors. > Signage indicating locations and health and safety measures regarding overhead lines will be erected in canteens and on site. > All staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021'. This will encompass the use of all necessary Personal Protective Equipment and adherence to the site Health and Safety Plan. > All health and safety measures as detailed in Section 5 of the CEMP and Chapter 5 Population and Human Health will be adhered to during the construction, operation and decommissioning phases. > Any area where excavations are planned will be surveyed and all existing services will be identified prior to commencement of any works. > Liaison will be had with the relevant sections of the Local Authority including all the relevant area engineers to ensure all services are identified. > Excavation permits will be completed, and all plant operators and general operatives will be inducted and informed as to the location of any services. > The contractor must comply with the standard construction codes of practice in relation to working around electricity, gas, water, sewage and telecommunications networks.		
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			> In advance of any construction activity, the contractor will undertake pre-commencement surveys to confirm the presence or otherwise of any services such as water supplies. If found to be present, the relevant service provider will be consulted with in order to determine the requirement for specific excavation or relocation methods and to schedule a suitable time to carry out works. > Whilst the Proposed 110kV Underground Cabling Route is not predicted to interact with Uisce Éireann assets, should it not be possible to be cross and water main by undercrossing or overcrossing, the water supply will be turned off by the utility so work can commence on diverting the service. The section of existing pipe will be removed and will be replaced with a new pipe along the new alignment of the service. The works will be carried out in accordance with the utility standards.		
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18.2

EIAR Monitoring Measures

Table 18-2 Schedule of Monitoring

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

			> The following minimum analytical suite shall be used: pH, EC, TSS, BOD, Total P, Ortho-P, Total N, and Ammonia. > Review of operator's records for plant inspections, evidence of contamination and leaks, and drainage checks made after extreme weather conditions.			
MX03	Pre-Construction Baseline Monitoring	<i>Appendix 4-4:</i>	Water quality field testing and laboratory analysis will be undertaken prior to commencement of felling and construction at the Site. The monitoring programme will be subject to agreement with Waterford City & County Council but will be based on the planning stage programme already outlined in the EIAR and CEMP and presented in this document. Analysis will be for a range of parameters with relevant regulatory limits along with Environmental Quality Standards (EQSs) and sampling will be undertaken at designated locations Baseline sampling will be completed on at least two occasions, and these should ideally coincide with low flow and high flow stream conditions. The high flow sampling event will be undertaken after a period of sustained rainfall, and the low flow event will be undertaken after a dry spell.	As required	As Necessary	ECoW
MX04	Badger	<i>Chapter 6:</i>	Due to time that can elapse between the original surveys, any future planning consent and commencement of construction, a pre-construction badger survey will be carried out to identify the presence of any setts that may have been established in the intervening period, no more than 10 months in advance of construction. If a newly established sett is found within 50m of the Proposed Project footprint, further monitoring and mitigation in line			

			with TII (2005), and in consultation with the NPWS where deemed necessary, will be prescribed as appropriate.			
MX05	Otter	<i>Chapter 6:</i>	A pre-commencement survey for otter will be undertaken within 150m upstream and downstream of the proposed new watercourse crossings and crossing upgrades that are required within the Site in advance of commencement of works. If a holt is found within 150m of construction areas, the works will be undertaken in line with TII (2006)⁴ and if a potential for disturbance is identified, these works will not be undertaken until a derogation licence is obtained. The requirement for a pre-construction survey does not represent a lacuna in the survey assessment but is fully in line with industry best practice. The function of the survey will be to assess any changes in baseline conditions since the time of undertaking the baseline surveys.			
MX06	Pine Marten/ Red Squirrel	<i>Chapter 6:</i>	Due to time that can elapse between the original surveys, any future planning consent and commencement of construction, a pre-construction survey for pine marten/red squirrel will be carried out to identify the presence of any potential new breeding sites. These surveys will focus on areas of conifer plantation to be felled and all suitable habitat within 50m of the felling footprint. Any potential breeding sites should be monitored to ascertain if they are active breeding sites. Surveys will be undertaken in line with Nature Scot⁵ and TII⁶ guidelines.			

⁴ TII (2006). *Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes*. Dublin: National Roads Authority.

⁵ <https://www.nature.scot/sites/default/files/2018-09/Species%20Planning%20Advice%20-%20red%20squirrel.pdf>

⁶ TII guidance (TII, 2009, *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*. Dublin: National Roads Authority).

MX07	Birds	Chapter 7	Pre-commencement and construction monitoring are proposed to identify sensitive nests or roosts in proximity to the works. It is proposed that major construction works will commence outside the bird nesting season (1st of March to 31st of August inclusive) to avoid the most sensitive time of the year for most bird species with the potential to use the Site and its environs. A pre-commencement survey will be undertaken prior to the initiation of works at the Proposed Wind Farm site. This survey will be conducted a maximum of three weeks before the commencement of works. Following commencement, construction phase surveys will be conducted during works. These surveys will be conducted once per month during the breeding season (April to July) and once at the start of the winter season (October). These surveys will continue to be conducted each season for the duration of the construction period. The aim of the pre-commencement and construction phase surveys is to identify sensitive sites (e.g., nests or roosts) in proximity to works. The surveys will be undertaken by a suitably qualified ornithologist. The survey will include a thorough walkover survey to a 500m radius of the development footprint and/or all works areas. If winter roosts or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located and earmarked for monitoring at the beginning of the first winter or breeding season of the construction phase. If the roost/nest is found to be active during the construction phase no works shall be undertaken and any on-going works will cease within a species-specific buffer of this location in line with best practice guidance (e.g., Forestry Commission Scotland, 2006; NatureScot, 2022). No works shall be permitted within the buffer until it can be demonstrated that the roost or nest is no longer occupied. All site staff and subcontractors will be made aware of any restrictions to be imposed by means of a toolbox talk			
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			and a map of the 'no-work zone' will be made available to all construction staff. The restricted area will also be marked off to alert all personnel on site to the suspension of works within that area.			
Construction Phase						
MX08	Drainage Monitoring and Maintenance	<i>Appendix 4-4:</i>	An inspection and maintenance plan for the on-site drainage system will be prepared in advance of commencement of any works. Daily visual inspections of drains and outfalls will also be performed during the construction period to ensure suspended solids are not entering streams and rivers on site, to identify any obstructions to channels and to allow appropriate maintenance of the drainage regime. Should the suspended solids levels measured during construction be higher than the existing levels, the source will be identified, and additional mitigation measures implemented. Any excess build-up of silt levels at dams, the settlement pond, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed.	Weekly	As Necessary	ECoW
MX09	Daily Visual Inspections	<i>Appendix 4-4:</i>	Daily Visual Inspection locations are shown in Figure 4-1 and will be confirmed by the Project Hydrologist and ECoW, prior to the commencement of the construction phase, and a Daily Visual Check Sheet Template is included in Appendix C of Appendix 4-4. Daily Visual Inspections are subject to change upon commencement of construction activity and works in progress within the catchment areas. The following periodic inspection regime will be implemented: > Daily general visual inspections of site operations and inspections of all drainage infrastructure within the Site and in the surrounding area by the ECoW or a suitably qualified and competent person as delegated by the ECoW;	Daily	As Necessary	ECoW

			> Inspections to include all elements of drainage infrastructure to ensure the system is operating correctly and to identify and maintenance that is required. Any changes, such as discolouration, odour, oily sheen or litter will be noted and corrective action will be implemented. High risk locations such as settlement ponds will be inspected daily. Daily inspections checks will be completed on plant and equipment, and whether materials such as straw bales or oil absorbent materials need replacement; > Event based inspections by the ECoW as follows: ○ >10 mm/hr (i.e. high intensity localised rainfall event); ○ >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or, ○ Rainfall depth greater than monthly average in 7 days (prolonged heavy rainfall over a week). > Monthly site inspections by the Project Hydrologist/ ECoW during construction phase; > Quarterly site inspections by the Project Hydrologist/ ECoW after construction for a period of one year following the construction phase; and, > A written record will be maintained or available on-site within the CEMP which will be maintained on-site during the construction phase.			
MX10	Continuous Turbidity Monitoring	<i>Appendix 4-4:</i>	Turbidity monitors or sondes can be installed where required at locations surrounding the Site. The sondes will provide continuous readings for turbidity levels in the watercourse. This equipment will be supplemented by daily visual monitoring at their locations as outlined in the sections below.	Continuous and Daily	Daily	Project Hydrologist

			The proposed locations for continuous, in-situ monitoring will be confirmed by the Project Hydrologist prior to the commencement of the construction phase.			
MX11	Monthly Laboratory Analysis	<i>Appendix 4-4:</i> <i>Appendix 4-3:</i>	Baseline laboratory analysis of a range of parameters with relevant regulatory limits and EQSs shall be undertaken as per water monitoring programme for the Proposed Project. This will not be restricted to just these locations around the proposed renewable energy development site with further sampling points added as deemed necessary by the ECoW in consultation with the Project Hydrologist and Site Manager. During the construction phase, field testing and laboratory analysis of a range of parameters with relevant regulatory limits and EQSs shall be undertaken for each primary watercourse along the Proposed Grid Connection and within the Proposed Wind Farm site, and specifically following heavy rainfall events (i.e. weekly, monthly and event based).	Monthly	Monthly	ECoW in consultation with the Project Hydrologist and Site Manager.
MX12	Field Monitoring	<i>Appendix 4-4:</i> <i>Appendix 4-3:</i>	Field chemistry measurements of unstable parameters, (pH, conductivity, temperature) will be taken at the surface water monitoring locations, as per water monitoring programme for the Proposed Project and each primary watercourse along the Proposed Grid Connection Underground Cabling Route. These analyses will be carried out by either the ECoW or the Project Hydrologist. In-situ field monitoring will also be completed after major rainfall events, i.e. after events of >25mm rainfall in any 24-hour period. The Project Hydrologist will monitor and advise on the readings collected by in-situ field monitoring.	As required	Monthly	ECoW and Project Hydrologist
MX13	Construction Phase Drainage	<i>Appendix 4-4:</i>	The developer will appoint a Project Contractor who will be responsible for the construction of the Proposed Project in	Weekly	As Necessary	ECoW, Project

	Inspections and Maintenance	<i>Appendix 4-3:</i>	accordance with this SWMP which will be updated by the contractor as required during the construction phase of the Proposed Project. Drainage performance will form part of the civil works contract requirements. During the construction phase, the Project Contractor will be responsible for the effectiveness of drainage measures. This responsibility extends to drainage maintenance, to ensure that the installed drainage measures continue to perform as intended by the detailed drainage design. Silt fences, check dams, level spreaders and other drainage measures likely to form part of the detailed drainage design, require regular maintenance to ensure they continue to function effectively, and the Project Contractor is entirely responsible for this maintenance. Regular inspections of all existing and installed drainage measures should be undertaken by the Project Contractor, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water within the system. The contractor will devise a system of recording the findings of these inspections. Any excess build-up of silt levels at check dams, the settlement ponds, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed. For this reason, the drainage measures installed on-site should be inspected at least weekly by the contractor and maintained as required during the construction phase of the Proposed Project to ensure good performance. The ECoW will monitor the effectiveness of the on-site drainage during changing weather, ground or drainage conditions encountered on site, through their regular visual inspections of on-site watercourses and water monitoring programme. Where it appears that additional drainage measures will be required to ensure the drainage system remains effective, the ECoW will notify the contractor, the developer and project design team including the Project Hydrologist. The ECoW's role in this regard does not replace the need for the weekly			Contractor and Project Hydrologist
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			(at least) inspections of the drainage system's measures by the Project Contractor.			
MX14	Site Inspections and Auditing	<i>Appendix 4-4:</i>	Routine inspections of construction activities will be carried out on a daily and weekly basis by the ECoW and the Site Supervisor/Construction Manager to ensure all controls to prevent environmental impact, relevant to the construction activities taking place at the time, are in place. The Project Hydrologist will also assist in compliance of testing and monitoring as required.	Daily, Weekly, Every six months	Every six months	ECoW, Site Supervisor/Construction Manager, Project Hydrologist
MX15	Sub-surface Archaeology	<i>Chapter 14:</i>	Archaeological monitoring under licence from the NMS of any geotechnical / engineering trial pits or investigations will be carried out by a suitably qualified archaeologist. A report detailing the results of the monitoring will be compiled on completion of the work and submitted to the NMS and Planning Authority/Body. Archaeological monitoring of ground works during the construction stage of the Proposed Project under licence from the NMS will be carried out by a suitably qualified archaeologist. Should archaeological finds, structures or deposits be uncovered as a result of the monitoring further mitigation measures such as preservation in situ or preservation by record (excavation) may be required and will be decided in consultation with the NMS. Such mitigation measures will be implemented where relevant following consultation with the NMS. A report detailing the results of the monitoring and/or any further necessary mitigation as referred to above will be compiled on completion of the work and submitted to the NMS and Planning Authority/Body. A walk-over survey of any areas currently forested and where infrastructure is proposed will be carried out post-clear-felling but prior to any other works.	As required	As required	Project Archaeologist

			The location of any potential Cultural Heritage features therein will be recorded and a photographic record made of same. A report on the results of the walk-over survey will be compiled on completion of same and will include any further required mitigation measures such as buffer zones, etc, deemed necessary.			
Operational Phase						
MX16	Operational Phase Drainage Management	<i>Appendix 4-4:</i>	The project hydrologist will inspect and review the drainage system after construction has been completed to provide guidance on the requirements of an operational phase drainage system. This operational phase drainage system will have been installed during the construction phase in conjunction with the road and hardstanding construction works. In the operational phase of the Proposed Project, the reliance on the drainage system summarised above will become reduced as areas naturally revegetate. Once areas revegetate, this will result in a resumption of the natural drainage management that will have existed prior to any construction.	As required	As necessary	ECoW or supervising hydrologist
MX17	Monthly Laboratory Analysis Sampling	<i>Appendix 4-4:</i>	Monthly sampling for laboratory analysis for the range of parameters adopted during pre- commencement and construction phases will continue quarterly after construction is complete. The Project Hydrologist will monitor and advise on the readings received from the testing laboratory and monitoring will only cease once the hydrologist is satisfied that the chemical and biological monitoring results show that there is no adverse impact on the quality of surface water within the natural watercourses draining the Site.	As required	As required	Project Hydrologist

MX18	Bats	<i>Appendix 6-2</i>	A programme of post-construction monitoring (PCM) will be implemented to assess the effects of the Proposed Wind Farm on bat activity and collision mortality, and to evaluate the effectiveness of the mitigation measures described above, including blade feathering and site-specific curtailment. The primary objective of the monitoring programme is to evaluate the effectiveness of the mitigation strategy and to ensure that the <i>Favourable Conservation Status</i> of local bat populations is maintained, as required under Regulation 54 of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended). The monitoring programme has been designed in accordance with NatureScot (2021), NIEA (2021) and BCI (2026) guidance and will follow an adaptive management approach. In accordance with NatureScot (2021) and BCI (2026), PCM will comprise two integrated components: > Fatality monitoring (carcass searches) to quantify collision mortality; and > Acoustic monitoring to assess bat activity patterns and potential displacement or attraction effects. Taking a precautionary approach and given that high collision risk was recorded at median and peak activity levels, an adaptive monitoring and mitigation strategy has been devised for the Proposed Project, in line with the case study example provided in Appendix 5 of NatureScot (2021) and based on the site-specific data.	Annual (First 3 years of operation)	Annual	ECoW/ Project Ecologist

			Monthly collision monitoring will be undertaken concurrently with the flight-activity surveys, with carcass searches conducted at each turbine base. These surveys will use a trained detection-dog team, with all bird species included as search targets. Searcher-efficiency and carcass-persistence trials will also be undertaken, and the resulting correction factors will be applied when estimating collision rates. These trials will include large-bodied bird carcasses as proxies to ensure that the estimates are representative of white-tailed eagle, along with small and medium-size birds. To further bolster the collision monitoring surveys, an additional human-led search will be conducted between successive monthly dog-led searches, resulting in an overall search interval of approximately two weeks. The species' large and conspicuous body size is expected to facilitate detection by human observers. The frequency and spatial coverage of both flight activity surveys and collision monitoring will be reviewed in light of emerging findings and adapted where necessary. Any proposed change to carcass search intensity would be undertaken in consultation with NPWS.			
MX19	White Tailed Eagle Monitoring	<i>Appendix 7-7</i>	In accordance with the mitigation hierarchy (IUCN, 2021), fallen-animal removal will be implemented as the first part of this mitigation plan to minimise the attraction of eagles into the turbine area; this is an established approach to reducing raptor collision risk (USFWS, 2013; Allison <i>et al.</i>, 2017). Its effectiveness will be assessed through flight-activity and collision monitoring. If either a pre-defined collision or flight-activity threshold is reached, additional measures will be implemented and evaluated in consultation with NPWS. While the required outcome and thresholds are fixed, the measures used to achieve them may be adapted in response to monitoring findings,	Monthly, with frequency to be reviewed based on findings.	Monthly	Project Ornithologist

			emerging evidence and technological developments, consistent with best practice in adaptive management. Monthly flight-activity surveys will be undertaken at the Proposed Wind Farm site to monitor activity within 500m of the turbine locations. The time birds spend flying at PCH will be recorded. Monthly collision monitoring will be undertaken concurrently with the flight-activity surveys, with carcass searches conducted at each turbine base. These surveys will use a trained detection-dog team, with all bird species included as search targets. Searcher-efficiency and carcass-persistence trials will also be undertaken, and the resulting correction factors will be applied when estimating collision rates. These trials will include large-bodied bird carcasses as proxies to ensure that the estimates are representative of white-tailed eagle, along with small and medium-size birds. To further bolster the collision monitoring surveys, an additional human-led search will be conducted between successive monthly dog-led searches, resulting in an overall search interval of approximately two weeks. The species' large and conspicuous body size is expected to facilitate detection by human observers. The frequency and spatial coverage of both flight activity surveys and collision monitoring will be reviewed in light of emerging findings and adapted where necessary. Any proposed change to carcass search intensity would be undertaken in consultation with NPWS			
MX20	Operational Bird Monitoring	<i>Appendix 7-7</i>	Operational monitoring will be undertaken at the Proposed Wind Farm site to monitor flight activity and turbines collisions, providing thresholds for adaptive monitoring. Following SNH (2009), monitoring will be conducted in years 1, 2, 3, 5, 10 and 15 of operation. Because monitoring informs the mitigation plan, the	Years 1, 2, 3, 5, 10 and 15		

			intensity of survey and the survey programme will be reviewed after three years and any changes that are deemed necessary will made in consultation with NPWS. The surveys that will be undertaken are: > Vantage Point Surveys > Collision Monitoring Surveys > Breeding Woodcock Survey Vantage Point Surveys Vantage point surveys will be undertaken to monitor flight activity within a 500m radius of the turbines. The objective of the surveys is to provide information on bird use of the area and interactions with turbines after construction of the wind farm that can be compared to pre-planning data. Vantage point surveys will be conducted from fixed locations used during pre-planning surveys to provide full coverage of the turbines to a 500m radius. Should vantage point locations need to be moved, a viewshed analysis will be conducted to ensure there is still comprehensive coverage of the 500m radius of turbines at the new locations. Surveys will sbe conducted monthly. Survey methodology should follow NatureScot (2025) and any revisions to the same. The surveyor should collect data on bird observations and flight activity from the scanning arc of 180° to a 2km radius at the fixed vantage point locations for two 3-hour watches separated by a minimum 30-minute break (i.e., 6 hours total) per month. Surveys should be spread over the full daylight period between sunrise and sunset. Flight activity of target species will be mapped and recorded as per three defined flight bands chosen in relation to the dimensions of the			
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			turbines as built: below rotor swept height, at the rotor swept height and above rotor swept height. When a target species is detected, the location of the bird will be recorded on a map and the surveyor will provide the following details: time, species, number of birds, activity/behaviour, the primary habitat used (and secondary and tertiary habitat if applicable) and any other notes of interest. Collision Monitoring Carcass searches for all bird casualties as a result of collision with turbines will follow survey methods broadly based on guidelines issued by the SNH (2009) and search methods adopted by Duffy and Steward (2008; or any revisions to the same). A monthly programme of carcass searches is proposed to ensure the mitigation strategy is informed by robust, contemporary data. Monthly carcass searches will be conducted at each turbine base, and should use a trained detection-dog team, with all bird species included as search targets. To increase the likelihood of detecting any white-tailed eagle collision, an additional human-led search will be conducted between successive monthly dog-led searches, resulting in an overall search interval of approximately two weeks. The species' large and conspicuous body size is expected to facilitate detection by human observers. The area around each turbine base to be searched will be based on the turbine size and surrounding landscape. If a bird carcass is found, the following details will be recorded: GPS location of each bird carcass, photographic record, carcass condition (intact - carcass that is completely intact or not badly composed; scavenged - evidence that the carcass was fed upon by a scavenger/predator; or feather spot - ten or more feathers indicating predation or scavenging or two or more primary feathers must be present to consider the carcass a casualty), distance from the turbine, date and time.			
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			Carcass removal trials and searcher efficiency trials will be undertaken to account for the ability of the searcher to find bird carcass and the likelihood of scavenging of carcass by animals. This is done to ensure a more accurate estimation of the total number of collision victims. During carcass removal trials, a carcass is placed in a Proposed Wind Farm periodically and is monitored for a set number of days or until scavengers remove the carcass. A determination on carcass removal is made when no body parts containing flesh or bone or >10 disarticulated feathers can be found. During searcher efficiency trials, a number of carcasses are placed within the wind farm by one worker, then searched for by the carcass searcher later. The result of these trials is a correction factor that can be applied to the results of the carcass searches. These trials will include large-bodied bird carcasses as proxies to ensure that the estimates are representative of white-tailed eagle. Breeding Woodcock Survey A breeding woodcock survey will be conducted at the Proposed Wind Farm site including the 3.6ha of native woodland proposed to be planted in proximity to a tributary of the River Licky as part of the Biodiversity Management and Enhancement Plan (BMEP) for the Proposed Wind Farm. Breeding woodcock surveys will be undertaken for Years 3 and 5 of operation (allowing time for trees to establish) to provide comparable data to the pre-planning period as well as information on woodcock use of the native woodland. Surveys should identify breeding woodcock territories by locating roding (breeding display) males. Survey methodology will follow Gilbert <i>et al.</i> (1998) and any revisions to the same: the surveyor will walk transects for 2 hours from dusk until last visible light during which all woodcock observations were mapped, with particular			
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			reference to roding observations. Each transect will be surveyed three times during the core breeding season of May and June.			
MX21	Wind Turbine Noise	<i>Chapter 12:</i>	Noise Compliance Monitoring refers to testing the wind turbine noise levels due to the Proposed Project against the planning conditions, in terms of overall noise levels. Prior to the commissioning of the Proposed Wind Farm, the Applicant will submit a Noise Compliance Monitoring Protocol (NCMP) (see Section 12.5.2) to the planning authority for written agreement and approval. The NCMP will include detailed methodologies for noise measurements, procedures for recording results, and a protocol for managing complaints in accordance with the most up to date guidance, standards, and industry best practice. It is a standard procedure for this to be agreed under the planning condition compliance framework. Compliance noise surveys will be undertaken to verify compliance with any noise conditions applied to the development. It is common practice to commence surveys within six months of a wind farm being commissioned. The guidance outlined in the IOA GPG and Supplementary Guidance Note 5: Post Completion Measurements (July 2014) will be implemented. In the unlikely event that an exceedance of the noise criteria is identified as part of the commissioning assessment, relevant corrective actions will be undertaken. For example, implementation of noise reduced operational modes resulting in curtailment of turbine operation can be implemented for specific turbines in specific wind conditions to ensure turbine noise levels are within the relevant noise criterion or conditions turbine noise limits. Such curtailment can be applied using the wind farm SCADA system with a marginal reduction of the wind turbine performance. After the implementation	As required	As required	Project Acoustician

			of the mitigation measures, the noise survey will be repeated to confirm compliance with the planning conditions. In the event of a complaint associated with noise for example, tonality or amplitude modulation from the proposed project, as discussed in Chapter 12, Section 12.3.5.12 and in line with the NCMP documents to be submitted and agreed with the local authority, the operator will fully investigate the complaint in collaboration with the turbine manufacturer, through review of the meteorological periods and conditions. If an ongoing issue with excessive AM is established, a mitigation strategy to reduce the level of AM will be implemented through engineering methods, operational changes and/or curtailment of specific turbines. The operator would first appoint a qualified acoustic consultant to objectively assess the level of AM in accordance with the methods outlined in the Institute of Acoustics IOA Noise Working Group (Wind Turbine Noise) Amplitude Modulation Working Group Final Report: A Method for Rating Amplitude Modulation in Wind Turbine Noise (9 August 2016) or subsequent revisions. All modern turbines have the ability to control their power and noise levels in a similar manner, and the suitability of any turbine for the site will be dependent on whether it can operate in an efficient manner while also remaining within any noise limits that may be conditioned in the event of favourable consideration.			
Decommissioning Phase						
MX22	Biodiversity	<i>Appendix 4-6:</i>	➤ The areas within 50m of the hard-stand and turbine foundations will be subject to a pre-works terrestrial ecology walkover to highlight any constraints that may be present (e.g. breeding or	As required	As necessary	Suitably Qualified Ecologist

			resting places of protected species, presence of Invasive Plant Species). > If any significant constraints are identified appropriate controls will be developed and integrated into the live decommissioning plan ahead of the commencement of the work.			
MX23	Invasive Species Management	<i>Appendix 4-6:</i>	> Prior to decommissioning, a suitably qualified ecologist will complete an invasive species survey of the Site to identify invasive species where any minor excavation will be required. If present in these areas, the ecologist will propose suitable management measures.	As required	As necessary	Project Ecologist
MX24	Bird Monitoring Programme	<i>Appendix 7-7</i>	An appropriate Decommissioning Plan will be prepared in advance of the decommissioning of the proposed turbines. This plan will include the measures proposed for the construction monitoring (Section 3.1) and will be developed in consultation with the Planning Authority and the NPWS. The aim of the plan will be to identify and protect sensitive nests, roosts or other key areas in proximity to decommissioning works. The requirements of the plan will be informed by the findings of the operational monitoring, along with the findings of other relevant ornithological surveys conducted in the interim where available. Methodologies should follow the current best practice guidance at the time the plan is prepared.	To be Decided	Annually	Project Ornithologist
MX25	Ornithology	<i>Appendix 4-6</i>	> The areas within 50m of the hard-stand and turbine foundations will be subject to a pre-works ornithology walkover to highlight any constraints that may be present (e.g. breeding or resting places of protected species). If any significant constraints are identified, appropriate controls will be developed and integrated into the live decommissioning plan ahead of the commencement of the work.	Once off	As required	Suitably Qualified Ornithologist

MX26	Decommissioning	<i>Appendix 4-6</i>	> Routine inspections of decommissioning activities will be carried out on a daily and weekly basis by the ECoW and the Site Supervisor/Decommissioning Manager to ensure all controls to prevent environmental impacts, relevant to the decommissioning activities taking place at the time, are in place. > Environmental inspections will ensure that the works are undertaken in compliance with this Decommissioning Plan and all other planning application documents. Only suitably trained staff will undertake environmental site inspections.	Daily	Weekly	Site Supervisor/Decommissioning Manager
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