Environmental Impact Assessment Report (EIAR)

Ballydermot Wind Farm Co. Kildare & Co. Offaly

Chapter 19 – Schedule of Mitigation and Monitoring Measures

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19. SCHEDULE OF MITIGATION AND MONITORING MEASURES

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

All mitigation which will be implemented during the various phases of the Proposed Project are presented in Table 19-1 below. The mitigation measures have been grouped together according to their EIAR Chapter and Proposed Project phase and are presented under the following headings:

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

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

All monitoring measures which will be implemented during the pre-commencement, construction, operational and decommissioning phases of the Proposed Project are outlined in Table 19-2. All monitoring measures were set out in the relevant chapters of this EIAR. The monitoring proposals are presented in terms of the monitoring requirement, frequency of monitoring and the mechanism for reporting results where applicable. By presenting the monitoring proposals in the below format, it is intended to provide a monitoring schedule that can be reviewed and tracked during all phases of the Proposed Project to ensure that all required monitoring is completed.

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

19.1 EIAR Mitigation Measures

Table 19-1 Schedule of Mitigation Measures

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
EIAR Chapter 4: Description of the Proposed Project					
Pre-Construction Phase					
MM1	Environmental Management	EIAR Chapter 4	› All proposed activities on the Project Site will be provided for in an environmental management plan. A Construction and Environmental Management Plan (CEMP) has been prepared for the Proposed Project and is included in Appendix 4-4 of this EIAR. › The CEMP includes details of drainage, peat and spoil management, and resource and waste management, and clearly outlines the mitigation measures and monitoring proposals that are required to be adhered to in order to comply with the environmental commitments outlined in the EIAR. In the event that planning permission is granted for the Proposed Project, the CEMP will be updated prior to the commencement of the development, to address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned, and will be submitted to the Planning Authority for approval.		
MM2	Environmental Management	Appendix 4-4	› The Project Developer will be required to engage an independently and suitably qualified Environmental Engineer, Environmental Scientist, or equivalent, with experience in wind farm construction to fulfil the role of Environmental Clerk of Works (EnvCoW) to oversee the construction works and audit the implementation of the CEMP. › The EnvCoW will report to the Project Developer and Project Contractor but will liaise closely with the Construction Manager in relation to the Project Contractor's day-to-day implementation of the CEMP on site.		

			› The EnvCoW will be nominated by the Project Developer to oversee the Project Contractor's effective implementation of the Proposed Project's environmental requirements and obligations, as captured in the CEMP. › The EnvCoW will be responsible for monitoring the works of the Project Contractor from an environmental perspective on behalf of the Project Developer. › For the sake of expediency, the EnvCoW will report their ongoing audit findings, monitoring results and site observations to both the Project Developer and the Proposed Contractor, having been nominated by the developer to fulfil the role. › The level, detail and frequency of reporting expected from the EnvCoW for the Construction Manager, Developer's Project Manager, and any Authorities or other Agencies, will be agreed by all parties prior to commencement of construction, and may be further adjusted as required during the course of the Proposed Project.		
MM3	Surface Water Quality	Appendix 4-6	› Water quality field testing and laboratory analysis will be undertaken prior to commencement of clear-felled forestry, vegetation removal and construction at the Project Site. The monitoring programme will be subject to agreement with Offaly and Kildare 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 as outlined in Figure 4-1 in the Surface Water Management Plan (Appendix 4-6). › Baseline sampling will be completed on at least two occasions, and these should ideally coincide with low-flow and high-flow stream conditions. The high-flow sampling event will be undertaken after a period of sustained rainfall, and the low flow event will be undertaken after a dry spell. › A network of existing bog 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 it is during the pre-construction phase. › However, prior to commencement of works in sub-catchments across the Proposed Wind Farm 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 Proposed Wind Farm site, as works in all areas will not commence simultaneously.		

MM4	Site Drainage Plan	EIAR Chapter 4 Appendix 4-4 Appendix 4-5 Appendix 4-6	› The Project Hydrologist will complete a detailed drainage design and maintenance plan before construction commences and will attend the site to set out and assist with micro-siting of proposed drainage controls as outlined in Section 4.7 in Chapter 4 of the EIAR. › Prior to commencement of construction works in sub-catchments across the Project Site, main drain inspections will be completed to ensure ditches and streams are free from debris and blockages that may impede drainage. It is proposed to complete these inspections on a catchment-by-catchment basis as the construction works develop across the Project Site, as works in all areas will not commence simultaneously. › 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 where possible. Within the Proposed Wind Farm site, there are a total of 15 no. watercourse crossing locations over natural watercourses (rivers and streams). There are 2 no. crossing locations over the Figile River that will have existing infrastructure removed and will be upgraded with a clear span bridge. › There will be no direct discharges to any natural watercourses, with all drainage waters being dispersed as overland flow using in-situ drainage and settlement ponds. All discharges from the proposed works areas will be made over vegetation filters at an appropriate distance from natural watercourses, i.e., 50m. Buffer zones of 50m around the existing natural watercourses and 10m buffer around main drains have been used to inform the layout of the Proposed Project. › The drainage proposed within the Proposed Wind Farm site will not significantly alter the existing drainage regime within the Allen Bog Group. Moreover, the proposed drainage system will be fully integrated into the existing bog drainage systems. Existing field drains and main drains will be routed under/around access tracks using culverts as required.		
MM5	Preparative Site Drainage Management	EIAR Chapter 4 Appendix 4-4 Appendix 4-6	› A sufficient number of straw bales, clean drainage stone, terram, stakes, etc., will be kept on site at all times to implement the drainage design measures as necessary. The drainage measures detailed in the above will be installed prior to, or at the same time as the works they are intended to drain.		

MM6	Drainage Inspection	Appendix 4-4 Appendix 4-6	› Prior to commencement of construction works in sub-catchments across the Project Site, main drain inspections will be completed to ensure ditches and streams are free from debris and blockages that may impede drainage. It is proposed to complete these inspections on a catchment-by-catchment basis as the construction works develop across the Project Site, as works in all areas will not commence simultaneously.		
MM7	Watercourse Inspection	EIAR Chapter 4 Appendix 4-4	› Confirmatory inspections of the proposed new watercourse crossing location will be carried out by the Project Civil/Structural Engineer prior to the construction of the crossing.		
MM8	Drainage Maintenance	Chapter 4 Appendix 4-4 Appendix 4-6	› An inspection and maintenance plan for the drainage system onsite will be prepared in advance of commencement of any works on the Proposed Project. Regular inspections of all installed drainage features will be carried out, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water at parts of the systems where it is not intended. The inspection of the drainage system will be the responsibility of the EnvCoW. › If necessary, any excess sediment build up behind check dams will be removed. For this reason, check dams will be inspected and maintained weekly during the construction phase of the Proposed Project to insure adequate performance. Maintenance checks will also ensure the centre elevation of the dam remains lower than the sides of the dam. › Check dams will also be inspected following rainfall events to ensure the structure of the dam is still effective in controlling flow. Any scouring around the edges of the check dams or overtopping of the dam in normal flow conditions will be rectified by reinforcement of the check dam. › Drainage swales will be regularly inspected for evidence of erosion along the length of the swale. If any evidence of erosion is detected, additional check dams will be installed to limit the velocity of flow in the channel and reduce the likelihood of erosion occurring in the future.		

			› Peat ditch silt traps will be inspected weekly during the construction phase of the Proposed Project and following rainfall events. Inlet and outlets will be checked for sediment accumulation and anything else that might interfere with flows. › A water level indicator such as a staff gauge or level marker will be installed in each temporary settlement pond with marks to identify when sediment is at 10% of the pond's capacity. Sediment will be cleaned out of the stilling pond when it exceeds 10% of pond capacity. Stilling ponds will be inspected weekly during the construction phase of the project and following rainfall events. Inlet and outlets will be checked for sediment accumulation and impediments to flow. Any excess sediment build-up behind inlets and outlets will be removed.		
MM9	Earthworks	Appendix 4-6	› Avoid physical damage (river/stream banks and river/stream beds) to watercourses and associated release of sediment; › Avoid excavations within close proximity to surface watercourses; › Avoid the entry of suspended sediment from earthworks into watercourses; and, › Avoid the entry of suspended sediment from the construction phase drainage system into watercourses, achieved in part by ending drain discharge outside the buffer zone and allowing percolation across the vegetation of the buffer zone.		
MM10	Tree Felling/ Vegetation Removal	Chapter 4,9 Appendix 4-4 Appendix 4-6	The following items will be carried out 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; › Inspection of all areas reported as having unusual ground conditions; › Inspection of main drainage ditches and outfalls. During pre-felling inspections the main drainage ditches will be identified. Ideally the pre-felling inspection will be carried out during rainfall; › Following tree felling all main drains will be inspected to ensure that they are functioning; › Extraction tracks within 10m of drains will 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 Project Site, if impeded by silt or debris, will be unblocked; and,		

			❯ All accumulated silt will be removed from drains and culverts, and silt traps, and this removed material will be deposited away from watercourses to ensure that it will not be carried back into the trap or stream during subsequent rainfall. Before the commencement of any vegetation removal works, an ECoW shall be appointed to oversee the works. The ECoW shall be experienced and competent, and shall have the following functions as proposed in the planning application: ❯ Attend the site for the setup period when drainage protection works are being installed and be present on site during all vegetation removal works ❯ Prior to the commencement of works, review and agree the positioning by the Operator of the required Aquatic Buffer Zones (ABZs), silt traps, silt fencing, water crossings and onsite storage facilities for fuel, oil and chemicals; ❯ Be responsible for preparing and delivering the environmental Toolbox Talk (TBT) to all relevant parties involved in site operations, prior to the commencement of the works. ❯ Conduct daily and weekly inspections of all water protection measures and visually assess their integrity and effectiveness in accordance with the proposals outlined in Section 4.2 of the CEMP (Appendix 4-4); ❯ 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: ○ Sampling shall be taken from the stream/riverbank, with no in-stream access permitted; ○ The following minimum analytical suite shall be used: potential of Hydrogen (pH), Emulsifiable Concentrate (EC), Total Suspended Solids (TSS), Biochemical Oxygen Demand (BOD), Total Phosphorus (Total P), Orthophosphate (Ortho-P), Total Nitrogen (Total N), and Ammonia; ○ Review of operator's records for plant inspections, evidence of contamination and leaks, and drainage checks made after extreme weather conditions; ○ Prepare and maintain a contingency plan; ○ Suspend work where potential risk to water from siltation and pollution is identified, or where operational methods and mitigation measures are not specified or agreed; and		

			○ Prepare and maintain a Water Protection Measure Register. This document is to be updated weekly by the EnvCoW.		
MM11	Traffic Management	EIAR Chapter 4, 15 Appendix 4-4 Appendix 15-2	› A detailed TMP has been prepared as part of the traffic impact assessment set out in Chapter 15 of this EIAR and is provided as Appendix 15-2. The deliveries of turbine components to the Proposed Wind Farm may be made in convoys of three to four vehicles at a time, and at night when roads are quietest. Convoys will be accompanied by escorts at the front and rear operating a "stop and go" system. Although the turbine delivery vehicles are large, they will not prevent other road users or emergency vehicles passing, should the need arise. The delivery escort vehicles will ensure the turbine transport is carried out in a safe and efficient manner with minimal delay or inconvenience for other road users. › Prior to the TMP being finalised, a full dry run of the transport operation along the potential routes will be completed using vehicles with attachments to simulate the dimensions of the wind turbine transportation vehicles. This dry run will inform the TMP for agreement with the relevant authorities.		
MM12	Waste Management	EIAR Chapter 4 Appendix 4-4	› Prior to the commencement of the development, a Construction Waste Manager will be appointed by the Contractor. The Construction Waste Manager will be in charge of the implementation of the objectives of the plan, ensuring that all hired waste contractors have the necessary authorisations and that the waste management hierarchy is adhered to. The person nominated must have sufficient authority so that they can ensure everyone working on the development adheres to the management plan.		
Construction Phase					
MM13	Refuelling	EIAR Chapter 4, 8, 9 Appendix 4-4	› Refuelling and maintenance of construction vehicles and plant will, where practicable, be undertaken off-site at controlled, designated fuelling facilities. Where refuelling or maintenance is required on-site, it will be undertaken at designated areas in accordance with the CEMP and appropriate pollution prevention procedures; › On-site re-fuelling will be undertaken using a double skinned bowser or a refuelling truck with spill kits kept onboard; › Only designated trained operatives will be authorised to refuel plant on-site;		

		Appendix 4-5 Appendix 4-6	› Taps, nozzles or valves associated with refuelling equipment will be fitted with a lock system; › All fuel storage areas will be bunded appropriately for the duration of the construction phase. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area; › Fuel and oil stores including tanks and drums will be regularly inspected by the appointed EnvCoW for leaks and signs of damage; › The Proposed Onsite Substation and the Proposed Offsite Substation will be bunded appropriately to the volume of oils likely to be stored and to prevent leakage of any associated chemicals to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor; › The plant used during construction will be regularly inspected for leaks and fitness for purpose; and, › An emergency plan for the construction phase to deal with accidental spillages will be developed (refer to Section 6 of this CEMP).		
MM14	Concrete-Based Products Deliveries and Management	EIAR Chapter 4, 9 Appendix 4-4	› No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place; › Where possible pre-cast elements for culverts and concrete works will be used; › No washing out of any plant used in concrete transport or concreting operations will be allowed on-site; › Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water is to be isolated in temporary lined wash-out pits located near proposed site compounds. These temporary lined wash-out pits will be removed from the site at the end of the construction phase; › Any washing out of concrete pumping plant will also be into the temporary lined wash-out pits; › Will use weather forecasting to plan dry days for pouring concrete; and, › Will ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event.		

MM15	Concrete Pouring	EIAR Chapter 4, 9 Appendix 4-4 Appendix 4-5 Appendix 4-6	› Using weather forecasting to assist in planning large concrete pours and avoiding large pours where prolonged periods of heavy rain is forecast. › Restricting concrete pumps and machine buckets from slewing over watercourses (including drains and ditches) while placing concrete. › Ensuring that excavations are sufficiently dewatered before concreting begins and that dewatering continues while concrete sets. › Ensuring that covers are available, and used, when necessary, for freshly placed concrete to avoid the surface washing away in heavy rain. › The small volume of water that will be generated from washing of the concrete truck's chute will be directed into a temporary, lined, impermeable containment area, or a Siltbuster-type concrete wash unit or equivalent. › Surplus concrete after completion of a pour will be taken off-site and disposed of at an appropriately authorised facility.		
MM16	Road Cleanliness	EIAR Chapter 4 Appendix 4-4	› Wheels or vehicle underbodies will be washed before leaving sites to prevent the build-up of mud on public (and site) roads. Internal site access roads will be constructed before other road-going trucks begin to make regular or frequent deliveries to the Project Site (e.g., with steel or concrete). The internal site access roads will comprise granular fill, and so the public road-going vehicles will not be travelling over soft or muddy ground where they might pick up mud or dirt. › The contractor will be responsible for ensuring that all vehicles egressing the Project Site have used the wheel wash facilities. However, a road sweeper will be made available by the contractor for the cleaning of public roads in the event that they are dirtied by trucks associated with the Proposed Project.		
MM17	Proposed Internal Cabling Works	EIAR Chapter 4 Appendix 4-4	› 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		

		Appendix 4-6	the cable trench works area immediately upon excavation, and in the case of the Proposed Project, would be backfilled into the existing trench.		
MM18	Water Discharge	EIAR Chapter 4 Appendix 4-4 Appendix 4-5 Appendix 4-6	› 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 Project Site where it might otherwise have come into contact with exposed surfaces and collected silt and sediment. The drains will be used to divert upslope runoff around the works area to a location where it can be redistributed over the ground surface as sheet flow. This will minimise the volume of potentially silty runoff to be managed within the construction area. › There will be no direct discharges to any natural watercourses, with all drainage waters being dispersed as overland flows using in-situ drainage and settlement ponds. All discharges from the proposed works areas will be made over vegetation filters at an appropriate distance from natural watercourses › All discharges from the proposed works areas will be made over vegetation filters at an appropriate distance from natural watercourses, i.e., 50m. › Dewatering silt bags are also used where water is pumped temporarily from excavations (e.g., turbine bases). Water is pumped into the silt bags, and then arising discharge is filtered through the silt bag fabric and flows into local collector drains. › Collect potentially silt-laden runoff from works areas via downgradient collector drains and manage via series of avoidance, source, in-line treatment and discharge to ground via infiltration drains and infiltration areas.		
MM19	Wastewater Management	EIAR Chapter 4	› All wastewater will be tankered off site by an appropriately licensed waste collector to wastewater treatment plants. It is not proposed to treat wastewater on site, and therefore the EPA's 2009 *'Code of Practice: Wastewater Treatment and Disposal Systems Serving Single Houses'* (EPA, 2009) and the EPA's 1999 manual on *'Treatment Systems for Small Communities, Business, Leisure Centres and Hotels'* does not apply. › Such a proposal for managing the wastewater arising on site has become standard practice on wind farm sites, 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 ACP as an acceptable proposal.		

			› The proposed wastewater storage tank will be fitted with an automated alarm system that will provide sufficient notice that the tank requires emptying. Full details of the proposed tank alarm system will be submitted to the Planning Authority in advance of any works commencing on site.		
MM20	Collector Drains	EIAR Chapter 4 Appendix 4-4	› Collector drains will be installed downgradient of the main works areas to collect surface flow runoff where it might have come into contact with exposed surfaces and collected silt and sediment. Swales will intercept the potentially silt-laden water from the excavations and construction areas of the Project Site and prevent it reaching natural watercourses. › Collector drains will be installed in advance of any main construction works commencing. The material excavated to make the swale will be compacted on the downslope edge of the drain to form a diversion dike.		
MM21	Interceptor Drains	EIAR Chapter 4, 9 Appendix 4-6	› 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 Project Site where it might otherwise have come into contact with exposed surfaces and collected silt and sediment. The drains will be used to divert upslope runoff around the works area to a location where it can be redistributed over the ground surface as sheet flow. › Where required, interceptor drains will be installed in advance of any construction works commencing.		
MM22	Check Dams	EIAR Chapter 4 Appendix 4-5 Appendix 4-6	› The velocity of flow in the interceptor drains and collector drains will be controlled by check dams, which will be installed at regular intervals along the drains to ensure flow in the drain is non-erosive. Check dams will also be installed in some existing artificial drainage channels present on the site under the IPC drainage network that will receive waters from works areas of the Project Site. › 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. The centre of the check dam will be approximately 150mm lower than the edges to allow excess water to overtop the dam in flood conditions rather than cause upstream flooding or scouring around the dams. Check		

			dams will not be used in any natural watercourses, only artificial drainage channels (field drains) and interceptor/collector drains. › Check dams will be inspected and maintained regularly to insure adequate performance during construction.		
MM23	Peat Ditch Silt Traps	EIAR Chapter 4 Appendix 4-6	› Silt traps where required will be installed in field drains downstream of drainage outfalls from works areas. › The peat ditch silt traps will be constructed using stacked timber logs, or marine plywood. These can also be covered in geotextile to enhance filtration.		
MM24	Vegetation Filters	EIAR Chapter 4 Appendix 4-6	› All discharges from the proposed works areas will be made over vegetation filters at an appropriate distance from natural watercourses, i.e. 50m.		
MM25	Temporary Construction Settlement Ponds	EIAR Chapter 4 Appendix 4-6	› Temporary construction settlement ponds will be used to attenuate runoff from main works areas (i.e., from turbine base/hardstand areas, construction compounds, and the substation) of the Project Site during the construction phase. › Settlement ponds will be located towards the end of collector drains, close to where the treated water will be discharged to existing IPC field drains/main drains. › During the construction phase, a water level indicator such as a staff gauge will be installed in each stilling pond with marks to identify when sediment is at 10% of the stilling pond capacity. Sediment will be cleaned out of the still pond if it exceeds 10% of pond capacity. Stilling ponds will be inspected weekly and following rainfall events. Inlet and outlets will be checked for sediment accumulation and other issues that might interfere with flows.		
MM26	Silt Bags	EIAR Chapter 4 Appendix 4-6	› 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 Project Site.		

			› Dewatering silt bags are also used where water is pumped temporarily from excavations (e.g., turbine bases). Water is pumped into the silt bags, and then arising discharge is filtered through the silt bag fabric and flows into local collector drains. › Dewatering silt bags can also be used as an additional filtration measure downgradient of settlement ponds, wherever it is deemed appropriate, throughout the Project 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 peaty silt into any field drain/main drain.		
MM27	Over-The-Edge (OTE) Drainage	Chapter 4 Appendix 4-6	› Over-the-edge (OTE) drainage allows runoff from access tracks to flow into local field drains and be managed via the existing site drainage system. OTE drainage will only occur where topography allows, in areas of low risk and remote from outfall locations (at least 150m from bog outfall locations). › Silt traps and check dams will be installed in field drains downstream of OTE drainage areas, and these measures will provide attenuation and treatment of any arising dirty water.		
MM28	Clear Span Watercourse Crossings	EIAR Chapter 4 Appendix 4-4 Appendix 4-6	There are existing clear-span bridges present at 2 no. location (Proposed Wind Farm Crossing 4 and Proposed Wind Farm Crossing 7 as per Section 4.4.1.11 of Chapter 4 of the EIAR) that will be demolished prior to the construction of the new proposed clear-span crossings. The standard construction methodology for the installation of a clear-span bridge watercourse crossing is as follows: 1. *The access road on the approach either side of the watercourse will be completed to a formation level which is suitable for the passing of plant and equipment required for the installation of each watercourse crossing.* 2. *All drainage measures along the proposed road will be installed in advance of the works.* 3. *A foundation base will be excavated to rock or competent ground with a mechanical excavator with the foundation formed in-situ using a semi-dry*		

			concrete lean mix. The base will be excavated along a 1m setback from the stream bank with no instream works required. 4. *Access to the opposite side of the watercourse for excavation and foundation installation will require the installation of a temporary pre-cast concrete or metal bridge across the watercourse to provide temporary access for the excavator. Plant and equipment will not be permitted to track across the watercourse.* 5. *Once the foundation base has been completed, the pre-cast concrete box culvert will be installed using a crane which will be set up on the bank of the watercourse and will be lifted into place from the bank with no contact with the watercourse.* 6. *Where the bottomless box culvert is installed in sections, the joints will be sealed to prevent granular material entering the watercourse,* 7. *Once the crossing is in position stone backfill will be placed and compacted against the structure up to the required level above the foundations.* 8. *Underground cabling ducting will be contained within the road make-up of the proposed crossing.* 9. *Temporary works, bunds, and containment systems will be removed once approved by the ECoW.* 10. *Post-construction inspections will be carried out to confirm no sedimentation or pollution has occurred.* 11. *A final compliance report will be prepared and submitted as required by the regulatory authorities and the new bridge structure will be inspected annually by a competent civil engineer*		
MM29	Culvert Crossing	EIAR Chapter 4, 9. Appendix 4-4	› All new proposed culverts and proposed culvert upgrades at field drain crossings required for the Proposed Wind Farm will be suitably sized for the expected peak flows in the watercourse. Some culverts may be installed to manage drainage waters from works areas of the Proposed Wind Farm, particularly where the waters must be taken from one side of an existing roadway to the other for discharge. The size of culverts will be influenced by the depth of the track or road sub-base but will have a minimum 900mm diameter. In all cases, culverts will be oversized to allow mammals to pass through the culvert.		

			› Culverts will be installed with a minimum internal gradient of 1% (1 in 100). Smaller culverts will have a smooth internal surface. Larger culverts may have corrugated surfaces which will trap silt and contribute to the stream ecosystem. Depending on the management of water on the downstream side of the culvert, large stone may be used to interrupt the flow of water. This will help dissipate its energy and help prevent problems of erosion. Smaller water crossings will simply consist of an appropriately sized pipe buried in the sub-base of the road at the necessary invert level to ensure ponding or pooling does not occur above or below the culvert and water can continue to flow as necessary. › All culverts will be inspected regularly to ensure they are not blocked by debris, vegetation or any other material that may impede conveyance.		
MM30	Silt Fences	EIAR 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 50m buffer zone of a stream. Installation locations will be confirmed during the finalisation of detailed drainage design following a pre-construction survey. › 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 CIRIA (No. C648, 1996). › Silt fence material will comprise Terrastop™ Premium material, and silt fences will be installed per the manufacturer's guidelines. Silt fences will be inspected on a regular basis to ensure that they are operating effectively.		
MM31	Proposed Grid Connection – cable trench drainage and existing services.	EIAR Chapter 4 Appendix 4-4	› Cable trenches are proposed to be constructed in short, controlled sections, thereby minimising the amount of ground disturbed at any one time and minimising the potential for drainage runoff to pick up silt or suspended solids. Each short section of trench is excavated, ducting installed and bedded, and backfilled with the appropriate materials, before work on the next section commences. This operation normally occurs over a period of 2-4 hours. › 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 backfilled into the existing trench › Any underground services encountered along the Proposed Grid Connection underground electrical cabling route will be surveyed for level and the ducting will pass over the service provided adequate cover is available. › A minimum clearance of 300 mm will be required between the bottom of the ducts and the service in question. If the clearance cannot be achieved the ducting will pass under the service and again 300 mm clearance between the top of the Proposed Grid Connection ducting and bottom of the service will be achieved. In deeper excavations an additional layer of marker tape will be installed between the ducting and top-level yellow marker tape. › If the required separation distances cannot be achieved then a number of alternative options are available such as using steel plates laid across the width of the trench and using 35N concrete surrounding the proposed ducting, with marker tape on the side of the trench. Back fill around any utility services will be with dead sand/pea shingle where appropriate.		
MM32	Turbine/Met Mast Foundation Excavations	EIAR Chapter 4 Appendix 4-4	› The extent of the excavation will be marked out and will include an allowance for trimming the sides of the excavation to provide a safe working area and slope batter; › Where practical, the soil will be stripped over the area of the excavation and stored locally for reuse, the subsoil will be excavated and stored to one side for reuse during the landscaping around the finished turbine; › No material will be removed from the Proposed Wind Farm with excavated peat and spoil being transported to the identified peat and spoil areas within the site. › All groundwater and surface water arising from turbine base excavation will be pumped to the dirty water system prior to discharge from the works area; › Soil excavation shall be observed by a qualified archaeologist in accordance with a scheme of archaeological monitoring to identify any significant remains as they come to light;		

			› The foundations excavation will be raised to formation level by compacted layers of well graded granular material will be spread and compacted to provide a hard area for the turbine foundation.		
MM33	Peat and Spoil Management	Appendix 4-3 Appendix 4-4	› An interceptor drain will be installed upslope of the designated peat deposition areas to divert any surface water away from these areas. This will reduce the likelihood of debris run-off. › 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. The material excavated to create the drain will be compacted on the downslope edge of the drain to form a diversion dike. As identified in the Peat and Spoil Plan (Appendix 4-3), the following recommendations/best practice guidelines for the placement of peat alongside the proposed infrastructure elements should be considered and taken into account during construction: › All excavated peat will be placed/spread alongside the proposed infrastructure elements (i.e. Proposed Wind Farm internal access roads and Proposed Turbine hardstands). › The peat/spoil placed adjacent to the proposed infrastructure elements should be restricted to a maximum height of 1.5m over a 20m wide corridor on both sides of the proposed access roads, or up to a 50m wide area around hardstands. It should be noted that the designer should define/confirm the maximum restricted height for the placed peat/spoil. › The placement of excavated peat and spoil is to be avoided without first establishing the adequacy of the ground to support the load. The placement of peat/spoil within the peat and spoil areas will require the use of long reach excavators, low ground pressure machinery and possibly bog mats in particular for drainage works.		

			› Where there is any doubt as to the stability of the peat surface then no material will be placed on to the peat surface. The risk of peat instability is reduced by not placing any loading onto the peat surface. › The surface of the placed peat/spoil will be shaped to allow efficient run-off of surface water. Shaping of the surface of the peat and spoil management areas will be carried out as placement of peat/spoil within the peat and spoil management area progresses. This will reduce the likelihood of debris run- off and ensure stability of the placed peat/spoil. › Finished/shaped side slopes in the placed peat/spoil will be not greater than 1 (v): 4 (h). This slope inclination will be reviewed during construction, as appropriate. Where areas of weaker peat and spoil are encountered then slacker slopes will be required. › Where present, the acrotelm will be placed on the finished surface with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the placed peat/spoil within the placement areas. › Movement monitoring instrumentation may be required adjacent to the access road where peat/spoil has been placed. The locations where monitoring is required will be identified by the Project Geotechnical Engineer on Project Site. › An interceptor drain will be installed upslope of the designated peat and spoil management areas to divert any surface water away from these areas. This will help ensure stability of the placed peat/spoil and reduce the likelihood of debris run-off. › All the above-mentioned commitments will be undertaken by the Contractor during construction.		
MM34	Temporary Construction Compound	EIAR Chapter 4 Appendix 4-4	› Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by an appropriately permitted waste collector to wastewater treatment plants. › The area to be used as the compound will be marked out at the corners using ranging rods or timber posts. Drainage runs, and associated settlement ponds will be installed around the perimeter;		

			› A limited amount of fuel will have to be stored on the Project Site and for the grid connection in appropriately bunded containers, a bunded area for oil storage will be constructed within the compound. › The proposed 10 no. temporary construction compounds will consist of: bunded refuelling and containment area for the storage of lubricants, oils, and site generators, etc., temporary site offices, staff facilities, and car-parking areas for staff and visitors. › If necessary, the compound will be fenced and secured with locked gates.		
Operational Phase					
MM35	Wastewater Management	EIAR Chapter 4	› The proposed wastewater storage tank will be fitted with an automated alarm system that will provide sufficient notice that the tank requires emptying. Full details of the proposed tank alarm system will 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 wind turbines, wind measurement devices and electricity substations that will be monitored remotely 24 hours per day, 7 days per week. Only waste collectors holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007 (as amended), will be employed to transport wastewater away from the Project Site.		
Decommissioning Phase					
MM36	Decommissioning	EIAR Chapter 4 Appendix 4-7	› A Decommissioning Plan has been prepared (Appendix 4-7), the detail of which will be agreed with the Local Authority prior to any decommissioning. The Decommissioning Plan will be updated prior to the end of the operational period in line with decommissioning methodologies that may exist at the time and will be agreed with the Planning Authority at that time. The potential for effects during the decommissioning phase of the Proposed Project has been fully assessed in the EIAR.		
MM37	Decommissioning	EIAR Chapter 4	› Upon decommissioning of the Proposed Wind Farm, the Proposed Turbines will be disassembled in the reverse order to how they were erected. The Proposed Turbines will be disassembled with a similar model of crane that was used for their erection. The		

		Appendix 4-7	› Proposed Turbines will likely be removed from the Proposed Wind Farm using the same transport methodology adopted for delivery to the Proposed Wind Farm initially. The Proposed Turbines materials will be transferred to a suitable recycling or recovery facility. › The underground electrical cabling connecting the Proposed Turbines to the Proposed Onsite Substation will be removed from the cable ducts and any direct buried cables will be cut and left in situ. The cabling will be pulled from the cable ducts using a mechanical winch which will extract the cable and re-roll it on to a cable drum. This will be undertaken at the original cable jointing pits which will be excavated using a mechanical excavator and will be fully re-instated once the cables are removed. › The cable ducting will be left in situ as it is considered the most environmentally prudent option, avoiding unnecessary excavation and soil disturbance. The cable materials will be transferred to a suitable recycling or recovery facility. › The Proposed Grid Connection and all the associated transmission infrastructure i.e. underground cables, overhead line cabling, steel masts, etc. will form part of the national grid infrastructure and operate in perpetuity as part of Transmission System and TAO assets and will remain in-situ. The assets transferred to the TAO will not form part of the decommissioning works.		
MM38	Refuelling	EIAR Chapter 4, 8, 9 Appendix 4-7	Wherever possible, vehicles will be refuelled off-site. This will be the case for regular, road-going vehicles. However, for construction machinery that will be based on-site continuously, a limited amount of fuel will have to be stored on site in appropriately bunded containers. On-site refuelling of machinery will be carried out at dedicated refuelling locations using a mobile double-skinned fuel bowser. The fuel bowser, a double-axle, custom-built refuelling trailer, will be re-filled off site and will be towed around the Project Site by a 4x4 jeep to where machinery is located. It is not practical for all vehicles to travel back to a single refuelling point, given the size of the cranes, excavators, etc. that will be used during the construction of the Proposed Project. The 4x4 jeep will also carry fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use.		

			Only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays, spill kits and fuel absorbent mats will be used during all onsite refuelling operations. The following mitigation measures are proposed to avoid release of hydrocarbons at the Project Site: › Refuelling and maintenance of construction vehicles and plant will, where practicable, be undertaken off-site at controlled, designated fuelling facilities. Where refuelling or maintenance is required on-site, it will be undertaken at designated areas in accordance with the CEMP and appropriate pollution prevention procedures; › On-site re-fuelling will be undertaken using a double skinned bowser or a refuelling truck with spill kits kept onboard; › Only designated trained operatives will be authorised to refuel plant on-site; › Taps, nozzles or valves associated with refuelling equipment will be fitted with a lock system; › All fuel storage areas will be bunded appropriately for the duration of the construction phase. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area; › Fuel and oil stores including tanks and drums will be regularly inspected by the appointed EnvCoW for leaks and signs of damage; › The Proposed Onsite Substation and the Proposed Offsite Substation will be bunded appropriately to the volume of oils likely to be stored and to prevent leakage of any associated chemicals to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor; › The plant used during construction will be regularly inspected for leaks and fitness for purpose; and, › An emergency plan for the decommissioning phase to deal with accidental spillages will be developed. Spill kits will be available to deal with accidental spillages.		
EIAR Chapter 5: Population and Human Health					

Pre-construction Phase					
MM39	Human Health	EIAR Chapter 5	› Prior to commencement of any works, the occupants of dwellings in the vicinity of the proposed works will be contacted and the scheduling of works will be made known. Local access to properties will also be maintained throughout any construction works and local residents will be supplied with the number of the works supervisor in order to ensure that disruption will be kept to a minimum.		
MM40	Traffic and Transport	EIAR Chapter 5	A Traffic Management Plan (TMP) has been developed in order to minimise any potential effect on the local population during the construction phase of the Proposed Project due to traffic.		
Construction Phase					
MM41	Human Health	EIAR Chapter 5 Appendix 4-4	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 (General Application) Regulations 2007 to 2023. The following mitigation measures are detailed below: › A Health and Safety Plan covering all aspects of the construction process will address the Health and Safety requirements in detail. This will be prepared on a preliminary basis at the procurement stage and developed further at construction stage. › All hazards will be identified, and risks assessed. Where elimination of the risk is not feasible, appropriate mitigation and/or control measures will be established. The contractor will be obliged under the construction contract and current health and safety		

			legislation to adequately provide for all hazards and risks associated with the construction phase of the project. SafePass registration cards are required for all construction, delivery and security staff. Construction operatives will hold a valid Construction Skills Certificate Scheme card where required. The developer and owners engineer are required to ensure a competent contractor is appointed to carry out the construction works. The contractor will be responsible for the implementation of procedures outlined in the Safety and Health Plan. Public safety will be addressed by restricting site access during construction. Fencing will be erected in areas of the site where uncontrolled access is not permitted. › Appropriate warning signs will be posted, directing all visitors to the site manager. Appropriate warning measures including 'goalposts' will be used as appropriate to prevent contact with any overheads lines that traverse the Project Site. › Goal posts will be established, where necessary, under overhead electricity lines for the entirety of the construction phase of the Proposed Project. › The suitability of machinery and equipment for use near power lines will be risk assessed. › All staff will be trained on operating voltages of overhead electricity lines running over the site. All staff will be trained to be aware of the risks associated with overhead lines. All contractors that may visit the site are made aware of the location of lines before they come on to site. › Barriers will run parallel to the overhead line at a minimum horizontal distance of 6 metres on plan from the nearest overhead line conductor wire. › When activities must be carried out beneath overhead lines, e.g., component delivery or substation construction, a site-specific risk assessment will be undertaken prior to any works. The risk assessment must take into account the maximum potential height that can be reached by the plant or equipment that will be used prior to any works. Overhead line proximity detection equipment will be fitted to machinery when such works are required. › Information on safe clearances will be provided to all staff and visitors. › Signage indicating locations and health and safety measures regarding overhead lines will be erected in canteens and onsite. › All staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2013 to 2021"' This will encompass the use of all necessary Personal Protective Equipment and adherence to the Site Health and Safety Plan.		

			The scale and scope of the project requires that a Project Supervisor Design Process (PSDP) and Project Supervisor Construction Stage (PSCS) be appointed in accordance with the provisions of the Health & Safety Authority's '*Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2013*'. The PSDP appointed for the construction stage shall be required to perform their 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 Proposed 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 will be required to perform their duties as prescribed in the Safety, Health and Welfare at Work (Construction) Regulations. These duties include (but are not limited to): › Development of the Safety and Health Plan for the construction stage, with updating where required as work progresses; › Compile and develop safety file information. › Reporting of accidents / incidents; › Weekly Site meeting with PSCS; › Coordinate arrangements for checking the implementation of safe working procedures. › Ensure that the following are being carried out:		

			› Induction of all site staff including any new staff enlisted for the project from time to time; › Toolbox talks as necessary; › Maintenance of a file which lists personnel on site, their name, nationality, current Safe Pass number, current Construction Skills Certification Scheme (CSCS) card (where relevant) and induction date; › Report on site activities to include but not limited to information on accidents and incidents, disciplinary action taken and PPE compliance; › Monitor the compliance of contractors and others and take corrective action where necessary; and › Notify the Authority and the client of non-compliance with any written directions issued.		
MM42	Air Quality: Dust Emissions	EIAR Chapter 5, 10 Appendix 4-4	› Truck wheels will be washed to remove mud and dirt before leaving the Project Site. All plant and materials vehicles will be stored in the compound area or other dedicated areas. Areas of excavation will be kept to a minimum, and stockpiling will be minimised by coordinating excavation, spreading and compaction. Construction traffic will be restricted to defined routes, and a speed limit will be implemented. › The active construction area along the Proposed Grid Connection underground electrical cabling route will be small, ranging from 100m to 150m in length at any one time. Should separate crews be used during the construction phase they will generally be separated by 1-2km. All construction machinery will be maintained in good operational order while on-site, minimising any emissions that are likely to arise. Aggregate materials for the construction of the cabling route will be sourced locally to reduce the amount of emissions associated with vehicle movements. › A wheel wash facility will be installed at all proposed construction site entrances and will be used by vehicles before leaving the Project Site. › Dust suppression measures, including water spraying of exposed surfaces and trafficked areas, will be implemented as required during dry weather conditions. In periods of extended dry weather, dust suppression will be necessary along Proposed Construction Haul Routes, site roads, grid route, road widening sections, substation, and construction compounds to ensure dust does not cause a nuisance.		

			○ If necessary, such as during periods of dry weather, de-silted water will be taken from stilling ponds via the existing drainage system within the Allen Bog Group, which encompasses part of the Proposed Project, and will be pumped into a bowser or water spreader to dampen down internal access roads, turbine bases and site compounds to prevent the generation of dust where required. ○ Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff as outlined in the CEMP. › Turbines components, construction materials and grid connection infrastructure will be transported to the Project Site via Proposed Construction Haul Routes, as agreed with the local authority. ○ The Proposed Construction Haul Routes adjacent to the Project Site will be regularly inspected for cleanliness and cleaned as deemed necessary by the construction Site Supervisor/Site Manager. › 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 dust emissions associated with vehicle movements. The nearest licensed waste facility located are: ○ Edenderry Recycling Centre is the closest waste facility to the Project Site and is approximately 3.5km north of the nearest Proposed Turbine (T32). ○ Drehid Landfill located approximately 6.5 km northeast of the nearest Proposed Turbine (T30). ○ Chem Regen located approximately 25.5 km southwest of the nearest Proposed Turbine (T14). ○ Cleary Compost & Shredding Ltd. located approximately 24.9 km south of the nearest Proposed Turbine (T14). ○ Soltec (Ireland) Ltd, located approximately 31.5 km northwest of the nearest Proposed Turbine (T32). ○ Allied Recycling located approximately 9.2km south of the Proposed Offsite Substation.		

			› Temporary Construction Compounds are spread out throughout the Project Site thus minimising the potential for traffic delays due to congestion building up at site entrance points and consequently further dust emissions. › All HGVs transporting construction materials to and from the Project Site will be covered with suitably secured tarpaulin sheeting to prevent dust emission during transit along Proposed Construction Haul Routes. › Vehicle speeds will be controlled when passing over access tracks and hardstanding areas within the Project Site, particularly during extended dry periods › If necessary, excavated material will be dampened prior to transport to the spoil management areas. › The Ecological Clerk of Works (ECoW) will perform daily visual site inspections of dust occurrence within the Project Site during construction, particularly during periods of dry weather and windy conditions. This will be noted as part of site environmental audits. The appointed construction manager for the contractor will be notified if dusty conditions are prevalent on site › The ECoW will have power to halt construction works if required. › The construction contractor will be required to monitor monthly dust deposition levels each month for the duration of construction phase for comparison with the guideline of 350mg/m2/day (for non-hazardous dusts). This monitoring will be carried out at a series of suitable locations within the Project Site. Where dust levels are measured to be above this, mitigation measures will be reviewed.		
MM43	Air Quality: Exhaust Emissions	EIAR Chapter 5, 10	› All construction vehicles and plant used during construction will be maintained in good operational order while onsite. If any vehicle requires repair, this work will be carried out, thereby minimising any emissions that arise. › Turbines components and construction materials will be transported to the site on specified routes only, unless otherwise agreed with the Planning Authority. › All machinery will be switched off when not in use. › Construction staff will be trained how to inspect and maintain construction vehicles and plant to ensure good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required.		

			› Aggregate materials for the construction of the internal access road network and all associated infrastructure will all be locally sourced where possible, which will further reduce potential emissions. › The expected waste volumes generated onsite are unlikely to be large enough to warrant source segregation at the Project Site. Therefore, all waste 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 will be local to the Project Site to reduce the amount of exhaust emissions associated with vehicle movements. › Edenderry Recycling Centre is the closest waste facility to the Project Site and is approximately 3.5km north of the nearest Proposed Turbine (T32). › Drehid Landfill located approximately 6.5km northeast of the nearest Proposed Turbine (T30). › Chem Regen located approximately 25.5km southwest of the nearest Proposed Turbine (T14). › Cleary Compost & Shredding Ltd. located approximately 24.9km south of the nearest Proposed Turbine (T14). › Soltec (Ireland) Ltd, located approximately 31.5km northwest of the nearest Proposed Turbine (T32). › Allied Recycling located approximately 9.2km south of the Proposed Offsite Substation. › Temporary Construction Compounds are spread out throughout the Project Site thus minimising the potential for traffic delays due to congestion building up at site entrance points and consequently further exhaust emissions.		
MM44	Climate	Chapter 5, 11 Appendix 4-4	› Construction staff will be trained how to inspect and maintain construction vehicles and plant to ensure good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required. › All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise. › When stationary, delivery and on-site vehicles will be required to turn off engines.		

			❯ Turbines and construction materials will be transported to the Project Site along the Proposed Construction Haul Routes and Proposed Turbine Delivery Route only unless otherwise agreed with the Planning Authority. Please see Section 15.1.10 of Chapter 15 Material Assets for details. ❯ Aggregate materials for the construction of the internal access road network and all associated infrastructure will all be locally sourced where possible, which will further reduce potential emissions. ❯ A CEMP (Appendix 4-4) will be in place throughout the construction phase. ❯ The CEMP (Appendix 4-4) includes a Resource Waste Management Plan (RWMP) which outlines the best practice procedures that will occur during the construction phase relating to waste material. ❯ The RWMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of construction of the Proposed Project. Disposal of waste will be seen as a last resort. ❯ Section 4.6.9 of Chapter 4 for this EIAR refers to the methodology that will be utilised to manage onsite waste. This waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor. ❯ The MRF facility will be local to the Project Site to reduce the number of emissions associated with vehicle movements. ○ Edenderry Recycling Centre is the closest waste facility to the Project Site and is approximately 3.5km north of the Proposed Turbine (T32). ○ Drehid Landfill located approximately 6.5km northeast of the Proposed Turbine (T30). ○ Chem Regen located approximately 25.5km southwest of the Proposed Turbine (T14). ○ Cleary Compost & Shredding Ltd. located approximately 24.9km south of the Proposed Turbine (T14). ○ Soltec (Ireland) Ltd, located approximately 31.5km northwest of the Proposed Turbine (T32). ○ Allied Recycling located approximately 9.2 km southeast of the Proposed Offsite Substation. ❯ Where applicable, low carbon intensive construction materials will be sourced and utilised onsite.		

MM45	Noise and Vibration	Chapter 5, 12 Appendix 4-4	› 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 assessment of potential impacts presented in Section 12.7.1 of Chapter 12 has demonstrated that the Proposed Project is expected to comply with the noise and vibration criteria during the construction phase and therefore no specific mitigation measures are required. › To ameliorate any potential noise impacts that may present during the construction phase, a schedule of noise control measures has been formulated in accordance with best practice guidance.		
MM46	Major Accidents and Natural Disasters	EIAR Chapter 5, 8, 9, 17 Appendix 4-4	› The Proposed Project is designed and will be constructed in line with current best practice and, as such, mitigation against the risk of major accidents and/or disasters will be embedded through the design. In accordance with the provision of the European Commission '*Guidance on the preparation of Environmental Impact Assessment Reports'* 2017, a Risk Management Plan will be prepared and implemented on site to ensure an effective response to disasters or the risk of accidents. The plan will include sufficient preparedness and emergency planning measures. › Potential effects associated with contamination during construction are addressed fully in Chapter 8: Land, Soils and Geology and Chapter 9: Water of this EIAR. Potential effects associated with bog fires during construction are addressed within Chapter 17: Major Accidents and Natural Disasters, Additionally, potential effects associated with peat instability is detailed in Chapter 8: Land, Soils and Geology. The mitigation measures outlined therein to protect environmental receptors as well as the procedures and measures described in the CEMP (Appendix 4-4) will ensure that the risk from these sources is low. › A CEMP has been prepared for the Proposed Project and is included in Appendix 4-4 of this EIAR. Upon a grant of planning permission for the Proposed Project, the CEMP will be updated prior to the commencement of the development. The CEMP will be a live document maintained by the contractor that will work to ensure that potential risks of major accident and/or disaster are identified, avoided, and mitigated, as necessary. Refer to		

			Appendix 4-4 for the CEMP that sets out the minimum standards to be employed by the contractor. › Appropriate fire prevention and response measures will be implemented in accordance with best practice and relevant guidance, including: › The safe storage and handling of fuels and flammable materials; › Provision of firefighting equipment onsite; › Implementation of emergency response procedures; and › Staff training and awareness. › Any use of tall structures including cranes above 45m such are subject to notification to the Irish Aviation Authority (IAA) 30 days prior to erection. › Flight within the airspace above the Aviation Study Area would be conducted via IFR or VFR, both require following the regulation applicable to Instrument Flight Rules (IFR) or Visual Flight Rules (VFR) Flight.		
Operational Phase					
MM47	Property Values	EIAR Chapter 5, 10, 12, 13	› All mitigation relevant to property values, outlined above and the corresponding chapters: Chapter 10: Air Quality, Chapter 12: Noise and Vibration, Chapter 13: Landscape and Visual, and Chapter 15: Material Assets, will be implemented in order to reduce insofar as possible, impacts on property values at properties located in the vicinity of Proposed Project construction works. › The Proposed Wind Farm has been designed in accordance with the parameters set out in the WEDG 2006 and with cognisance of the Draft WEDG 2019 Guidelines, adhering to the required setback distances from sensitive receptors set out in those documents.		
MM48	Human Health	EIAR Chapter 5	› Access to the turbines is through a door at the base of the structure, which will be locked at all times outside maintenance visits. The doors will only be unlocked as required for entry by authorised personnel and will be locked again following their exit. › Signs will be erected at suitable locations such as, amenity access points and carparks, setting out the conditions of public access under the relevant legislation and providing normal hours (and out of hours) contact details. Staff associated with the project will conduct frequent visits, which will include inspections to establish whether any signs have		

			been defaced, removed, faded, or are becoming hidden by vegetation or foliage, with prompt action taken as necessary. › Signs will also be erected at suitable locations across the Proposed Project as required for the ease and safety of operation of the wind farm. These signs include: › Buried cable route markers at 50 m (maximum) intervals and change of cable route direction; › Directions to relevant turbines at junctions; › "No access to Unauthorised Personnel" at appropriate locations; › Speed limits signs at site entrance and junctions; › "Warning these Premises are alarmed" at appropriate locations; › "Danger HV" at appropriate locations; › "Warning – Keep clear of structures during electrical storms, high winds or ice conditions" at site entrance; › "No unauthorised vehicles beyond this point" at specific site entrances; and › Other operational signage required as per site-specific hazards. › The Proposed Onsite Substation and Proposed Offsite Substation, which will be operated by ESB/EirGrid will be locked and fenced off from public access. The Proposed Onsite Substation and the Proposed Offsite 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. › 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. › Any waste generated at the Proposed Project will be managed in accordance the Waste Management Act 1996 and under the relevant EU legislation. › An operational phase Health and Safety Plan will be developed to fully address identified Health and Safety issues associated with the operation of the Proposed Project. Access for emergency services will be available at all times.		

			› 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 Health and Safety Plan for the operational phase will be completed in accordance with the most up to date health and safety legislation in force at the time of operation and will be submitted to the relevant local authority prior to the operational phase of the Proposed Project. › 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. During the operation of the Proposed Wind Farm regular maintenance of the turbines will be carried out by the turbine manufacturer or appointed service company. A project or task specific Health and Safety Plan will be developed for these works in accordance with the site's health and safety requirements.		
MM49	Shadow Flicker	EIAR Chapter 5	Where daily shadow flicker exceedances have been predicted at buildings by the modelling software, a site visit will be undertaken firstly to determine the level of occurrence, existing screening and window orientation. This will determine if the receptor has an actual line of sight to any turbine and actual potential for shadow flicker to occur. Once this exercise is completed at all the potentially affected properties, the following measures will be employed. **Wind Turbine Control Measures** 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 and are not cost prohibitive. A shadow flicker control unit allows a wind farm's turbines to be programmed and controlled using the wind farm's SCADA control system to change a particular turbine's operating mode during certain conditions or times or even turn the turbine off if necessary.		

			All predicted incidents of shadow flicker can be pre-programmed into the wind farm's control software. The wind farm's SCADA control system can be programmed to shut down any particular turbine at any particular time on any given day to ensure that shadow flickers occurrences at properties which are not naturally screened or cannot be screened with measures outlined above. Where such wind turbine control measures are to be utilised, they need only be implemented when the specific combined circumstances occur that are necessary to give rise to the shadow flicker effect in the first instance. Therefore, if the sun is not shining on a particular day that shadow flicker was predicted to occur at a nearby property, there would be no need to shut down the relevant turbines that would have given rise to the shadow flicker at the property. Similarly, if the wind speed was below the cut-in speed that caused the turbine rotor to rotate and give rise to a shadow flicker effect at a nearby property, there would be no need to shut down the relevant turbines that otherwise would have caused shadow flicker. The atmospheric variables that determine whether shadow flicker will occur or not are continuously monitored at the Proposed Wind Farm and the data fed into the wind farm's SCADA control system. The strength of direct sunlight is measured by way of photocells, and if the sunlight is of sufficient strength to cast a shadow, the shadow flicker control mechanisms come into effect. Wind speed and direction are measured by anemometers and wind vanes on each turbine and on the wind farm's met mast, and similarly, if wind speed and direction is such that a shadow will be cast, the shadow flicker control mechanisms come into effect. The moving blades of the turbine will require a short period of time to cease rotating and as such there may be a very short period (less than 3 to 5 minutes) during which the blades are slowed to a complete halt. The turbines giving rise to shadow flicker may be turned off on different days to prevent excessive wear and tear on any single turbine. To ensure that the model and SCADA system is accurate and working well a site visit will be carried out to verify the system. The shadow flicker prediction data will be used to select dates on which a shadow flicker event could be observed at one or multiple affected properties and the following process will be adhered to.		

			› *Recording the weather conditions at the time of the site visit, including wind speeds and direction (i.e., blue sky, intermittent clouds, overcast, moderate breeze, light breeze, still, etc.).* › *Recording the house number, time and duration of site visit and the observation point GPS coordinates.* › *Recording the nature of the sensitive receptor, its orientation, windows, landscaping in the vicinity, any elements of the built environment in the vicinity, vegetation.* › *In the event of shadow flicker being noted as occurring the details of the duration (times) of the occurrence will be recorded.* › *The data will then be sent to the wind farm operational team to confirm that the model and SCADA system are working.* › *Following 12 months of full operation of the Proposed Project a report can be prepared for the Local Authority describing the shadow flicker mitigation measures used at the wind farm and confirming the implementation and successful operation of the system.* This method of shadow flicker mitigation has been technically well-proven at wind farms in Ireland and in areas outside Ireland that experience significantly longer periods of direct sunlight. In order to demonstrate how the SCADA control system can be applied to switch off particular turbines at the relevant times and dates. Appendix 5-5 lists the 120 no. sensitive receptors at which a shadow flicker mitigation strategy may be necessary to ensure the WEDG 2006 30-minute per day shadow flicker threshold is not exceeded. In this case, the relevant turbine(s) would be programmed to switch off for the time required to reduce daily shadow flicker to below the guideline limit of 30 minutes. The SCADA control system would be utilised to control shadow flicker in the absence of being able to agree alternative mitigation measures with the relevant property owner. The mitigation strategy outlined in Table 5-12 is based on the theoretical precautionary scenario. The details presented in Table 5-12 list the days per year and the turbines that could be programmed to switch off at specific times, in order to reduce daily shadow flicker to a maximum of 28 minutes, which is below the WEDG 2006 limit of 30 minutes.		

			This measure will be utilised at the Proposed Wind Farm to prevent incidences of shadow flicker at any house if required. Therefore, the Proposed Wind Farm could be brought in line with the requirements of the Draft WEDG 2019 should they come into force during the planning application process for this Proposed Project. Should a complaint be received within 12 months of commissioning of the Proposed Wind Farm, field investigation/monitoring will be carried out by the wind farm operator at the affected property. Notwithstanding the approach set out above should shadow flicker associated with the permitted development be perceived to cause a nuisance at any home, the affected homeowner is invited to engage with the Applicant. The homeowner will be asked to log the date, time and duration of shadow flicker events occurring on at least five different days. The provided log will be compared with the predicted occurrence of shadow flicker at the residence, and if necessary, a field investigation will be carried out. **Screening Measures** In the event of an occurrence of shadow flicker exceeding guideline threshold values of 30 minutes per day at residential receptor locations, mitigation options will be discussed with the affected homeowner, including: › Installation of appropriate window blinds in the affected rooms of the residence; › Planting of screening vegetation; › Other site-specific measures which might be agreeable to the affected party and may lead to the desired mitigation. If agreement can be reached with the homeowner, then it would be arranged for the required mitigation to be implemented in cooperation with the affected party as soon as practically possible and for the full costs to be borne by the wind farm operator.		
MM50	Air Quality: Dust and Exhaust Emissions	EIAR Chapter 5, 10	› Any vehicles or plant brought onsite during the operational phase will be maintained in good operational order that comply with the Road Traffic Acts 1961 as amended, thereby minimising any emissions that arise.		

			› When stationary, delivery and on-site vehicles will be required to turn off engines. › Waste material will be transferred to a licensed /permitted MRF by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The nearest licensed waste facility located are: › Edenderry Recycling Centre is the closest waste facility to the Project Site and is approximately 3.5km north of the nearest Proposed Turbine (T32). › Drehid Landfill located approximately 6.5 km northeast of the nearest Proposed Turbine (T30). › Chem Regen located approximately 25.5 km southwest of the nearest Proposed Turbine (T14). › Cleary Compost & Shredding Ltd. located approximately 24.9 km south of the nearest Proposed Turbine (T14). › Soltec (Ireland) Ltd, located approximately 31.5 km northwest of the nearest Proposed Turbine (T32). › Allied Recycling located approximately 9.2km south of the Proposed Offsite Substation. › Amenity carparks are spread out throughout the Proposed Wind Farm thus minimising the potential for traffic delays due to congestion building up at site entrance points and consequently further exhaust emissions.		
MM51	Climate	EIAR Chapter 5, 11	› Ensure that all maintenance and monitoring vehicles will be maintained in good operational order while onsite, and, when stationary, be required to turn off engines thereby minimising any emissions that arise.		
MM52	Noise and Vibration	EIAR Chapter 5, 12 Appendix 12-6	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.		
MM53	Aviation	Chapter 5, 16	The IAA will be contacted to: 1. *agree an aeronautical obstacle warning light scheme for the wind farm development.* 2. *provide as constructed coordinates in WGS84 format together with ground and tip height elevations at each wind turbine location.* The Proposed Turbines will be subject to an approved lighting scheme being established and final positions and heights will be forwarded to the IAA for publishing in the Irish Aeronautical		

			Information Publication (AIP). Should the Irish Air Corps require the fitment of Infra-Red lighting compatible with the use of Night Vision Goggles (NVG), there are many types available, and a list of compatible lighting should be obtainable from the Air Corps technical services command. It is not known whether the Air Corps use NVG systems operationally, or during training, but their popularity in military, medevac and search and rescue (SAR) missions would suggest there is a high probability of use. In addition to the above measures, pilots of both VFR and IFR flights are required by the National Regulator to make themselves familiar with their route, airspace they will be flying within, and current Notice to Airmen (NOTAM) and Instrument Approach Procedures (IAPs) information. In addition, the Cushaling Wind Farm is currently operational. Flight adjustments have been made for the Cushaling Wind Farm, which is located within the centre of the Proposed Wind Farm. As such, this area would already be flagged for avoidance prior to the construction of the Proposed Project. The Edenderry/Allenwood/Rathangan LFTA cannot be mitigated directly (assuming that the activities do occur in the area of the Proposed Turbines) and therefore an alternative site will be required for this activity. The Applicant are committed to continuing engagement with the DoD/Irish Air Corps to facilitate an alternative location for LFTAs if feasible. If an alternative area is confirmed there will be no impact on the Edenderry/Allenwood/Rathangan LFTA.		
MM54	Major Accidents and Natural Disasters	Chapter 16, 17 Appendix 4-4	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*"[1], a Risk Management Plan (RMP) will be prepared and implemented on the Project Site to ensure an effective response to disasters		

[1] *European Commission, 2017. Guidance on the preparation of Environmental Impact Assessment Reports. Available at: https://op.europa.eu/en/publication-detail/-/publication/2b399830-cb4b-11e7-a5d5-01aa75ed71a1*

			or the risk of accidents. The RMP will include sufficient preparedness and emergency planning measures. Potential effects associated with contamination during construction, operation and decommissioning are addressed fully in in Section 8.5 of Chapter 8: Land, Soils and Geology and Section 9.5 of Chapter 9: Water. The mitigation measures outlined in Chapter 8 and Chapter 9 to protect environmental receptors as well as the procedures and measures described in the CEMP will ensure that the risk from these sources is low. A CEMP has been prepared for the Proposed Project and is included in Appendix 4-4 of this EIAR. The above Major Accidents and Natural Disaster Risk Assessment forms the basis of the Emergency Response Plan (ERP) which is contained within the CEMP. Upon a grant of planning permission for the Proposed Project, the CEMP will be updated to reflect the conditions stipulated in the consent prior to the commencement of the development. The CEMP will be a live document, maintained by the contractor, that will work to ensure that potential risks of major accident and/or disaster are identified, avoided and mitigated, as necessary. Refer to Appendix 4-4 for the CEMP that sets out the minimum standards to be employed by the contractor. The Proposed Project will also be subject to a fire safety risk assessment in accordance with Chapter 19 and the Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2013[2], which will assist in the identification of any major risks of fire on Project Site, and mitigation of the same during construction, operation and decommissioning. The ERP includes hazard identification procedures and mitigation measures which the site Supervisor/Construction Manager will carry out in case of a fire/explosion at the Project Site. Refer to Appendix 4-4 for an outline CEMP that sets out the minimum standards to be employed by the contractor. Potential effects associated with aviation during construction, operation and decommissioning are addressed fully in in Section 16.9 of Chapter 16: Aviation. During the construction phase,		

[2] *Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations (HAS, 2013):* https://www.hsa.ie/media/eq3dfjxk/103525-hsa-3-procurement-guideline-brochure.pdf

			any use of tall structures including cranes above 45m such are subject to notification to the Irish Aviation Authority (IAA) 30 days prior to erection. Flight within the airspace above the Aviation Study Area would be conducted via IFR or VFR, both require following the regulation applicable to IFR or VFR Flight.		
MM55	Interference with Telecommunication Systems and EMF	Chapter 5, 15 Appendix 15-8	› As part of the design of the Proposed Project, a relay mast has been incorporated to maintain telecommunications connectivity and avoid potential interference effects on telecommunications services. This embedded design measure has been included to ensure that existing telecommunications users continue to receive an appropriate level of service and to minimise the potential for adverse effects on telecommunications infrastructure. › Following the scoping and consultation exercise undertaken by MKO, further consultation with required telecommunication providers was held by Ai Bridges. While no additional mitigation measures are required to prevent significant effects, it is standard practice of 2RN to produce a protocol document for wind farm developments, which will be signed by the developer prior to construction. › Furthermore, the proposed relay mast will be used to mitigate any impacts to the Virgin Media links.		
Decommissioning Phase					
MM56	Decommissioning Phase	EIAR Chapter 5, 4 Appendix 4-7	The works required during the decommissioning phase are described in Section 4.12 in Chapter 4: Description of the Proposed Project. Any impact and consequential effect that occurs during the decommissioning phase on population and human health will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration, and the mitigation measures outlined above will be implemented during the decommissioning phase also. A Decommissioning Plan has been prepared as part of this EIAR and is included as Appendix 4-7. This Decommissioning Plan follows the most up to date NatureScot guidance and has been informed by other relevant environmental, health and safety, and planning guidance applicable to wind farm decommissioning. By its nature, the Decommissioning Plan is a working document and, in accordance with the NatureScot guidance, an updated Decommissioning Plan will be agreed with the local authorities three months prior to decommissioning the Proposed Project. The principles that will inform the final decommissioning plan are contained in the Decommissioning Plan in Appendix 4-7.		

EIAR Chapter 6: Biodiversity					
Pre-construction					
MM57	Flora and Fauna	EIAR Chapter 6	**Otter** No otter holts were recorded within 150m of any Proposed Project infrastructure during any of the surveys undertaken. However, it is noted that this is a mobile species and otter could potentially migrate within the Project Site. As such, prior to the commencement of construction works associated with the installation of watercourse crossings, a pre-commencement otter survey will be undertaken to ensure that no otter holts/breeding sites have been established since the original surveys undertaken (TII, 2008b). This will be undertaken by a suitably qualified ecologist in accordance with standard best practice guidance. **Badger** Due to the time that may elapse between the surveys undertaken to inform this assessment and the commencement of construction works, a pre-construction badger survey of the Proposed Project footprint and adjacent areas will be carried out by a qualified ecologist to determine whether any setts have been established in the intervening period. This will include a 50m buffer of all infrastructure, a 150m buffer of any areas where piling works are proposed, such as Proposed Turbine bases, as well as areas where felling is proposed (i.e. within the Proposed Enhancement Areas). All setts identified within this Biodiversity Chapter will also be re-surveyed in order to establish their status prior to the commencement of construction works, and to identify any additional sett entrances which may have been excavated in the intervening period.		
Construction Phase					
MM58	Surface Watercourses and	EIAR Chapter 6, 9	A drainage design for the Proposed Project is provided in Section 4.7 of Chapter 4 of this EIAR. This plan provides details of how water quality will be protected during the construction of the Proposed Project. In addition to this, specific mitigation is provided in relation to		

	Sensitive Aquatic Faunal Species		protection of surface water quality is provided in Chapter 9: Water of this EIAR, see Section 9.5. These mitigations relate to earthworks, vegetation removal, potential release of hydrocarbons during construction and storage, contamination from wastewater disposal, groundwater impacts, flooding impacts, and release of cement-based products.		
MM59	Bats	EIAR Chapter 6 Appendix 6-2 Appendix 6-5	**Bats** The below describes the best practice and site-specific mitigation measures that are in place to avoid and reduce the potential for significant effects on local bat populations. <u>Noise Restriction</u> › During the construction phase, all plant and equipment will be operated in accordance with the Construction Plant and Equipment Permissible Noise Levels Regulations (S.I. No. 632 of 2001, as amended). Plant machinery will be switched off when not in use, and works will be managed to minimise unnecessary noise generation. › Methodology and mitigation outlined in Chapter 12: Noise and Vibration will be followed to minimise noise and vibration during construction. › A minimum 10m buffer will be maintained between the Proposed Onsite Substation and Proposed Offsite Substation fence lines and the nearest retained linear habitat features. The treelines and hedgerows surrounding the Proposed Onsite Substation and Proposed Offsite Substation will be retained as bat commuting and foraging habitat. <u>Lighting Restriction</u> › During the construction phase, lighting requirements will be temporary and limited to areas where required for health, safety and security purposes, including temporary compounds and works associated with the Proposed Onsite Substation and Proposed Offsite Substation. Where works are required during hours of darkness, lighting will be directed away from retained woodland, treelines, hedgerows, and bat commuting or foraging habitats. Directional accessories, including baffles, hoods, cowls and louvres, will		

			be used where appropriate to reduce light spill and focus illumination only where required. The same restrictions will apply during decommissioning. › All permanent 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 Onsite Substation and Proposed Offsite Substation 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. <u>Biodiversity Management Plan</u> › The Project Site is predominantly located within cutover bog, with smaller areas of scrub, Calluna-dominated communities on Cutover bog, bog woodland, and sparse linear features such as hedgerows and treelines. These areas of hedgerows and treelines have been largely retained or avoided. However, there will be a requirement to remove 44.3ha of bog woodland habitat, 131.7ha of scrub and 60.7 ha of conifer plantation to facilitate the Proposed Wind Farm. While the Proposed Offsite Substation and the Proposed Turbine Delivery Route accommodation areas will require the removal of approximately 180m of Treeline habitat. These treelines will be replanted once works are completed. › As part of the BMP, it is proposed to plant a total of 45.3ha of native trees which over time will develop into native scrub and woodland habitat. All planting will consist of species indigenous to the local area. The BMP also proposes to create 246ha of scrub mosaic habitats, which combined with native tree planting will result in a net gain of these habitats. As well as habitat creation the BMP proposes the instalment of artificial roosting features which will be incorporated within the Proposed Wind Farm site to enhance roost availability and strengthen the ecological functionality of the landscape for bats. The enhancement measures will comprise a minimum of 15 no. bat boxes. Bat boxes will not be placed within the Proposed Turbine risk area to avoid encouraging bats to roost or forage within rotor-swept zones. All placements will be at the edges of the Proposed Wind		

			Farm, near existing linear features leading away from turbines or within Killina Bog Offsetting Area and Lodge Bog Enhancement area. › Overall, the proposed planting of native trees along with the creation of scrub mosaic habitats, will result in a net gain of scrub and woodland habitats within the Project Site. Alongside the instalment of artificial roosting features these measures will enhance both the roosting potential and the foraging and commuting opportunities for bats that use the area. **Collision Risk Mitigation Measures** Bat Felling Buffers In accordance with NatureScot (2021), Northern Ireland Environment Agency (NIEA) (2021) and Bat Conservation Ireland (BCI) (2026), a minimum 50m buffer is applied between turbine blade tips and habitat features used by bats (e.g. hedgerows, treelines and woodland edges), to reduce the risk of bat activity occurring within the rotor-swept zone. A 50m buffer between turbine blade tip and the nearest habitat feature will be implemented, based on the turbine specification for the two proposed turbine models (tip height: 200m and 220m; rotor diameter: 170m; hub height: 115m and 135m). These buffers were calculated using the Natural England formula (Plate 6-1) and have been incorporated into the Proposed Turbine layout. The application of these buffers forms a key embedded mitigation measure to reduce collision risk, particularly for high-risk species such as Leisler's bat and pipistrelle species, which utilise linear landscape features for commuting but also forage more widely in open habitats. Maintaining separation from these features reduces the likelihood of bats moving through the rotor-swept zone during commuting movements. To facilitate these buffers, areas of scrub, woodland, conifer plantation and other vegetation will be removed or managed within the Proposed Wind Farm in tandem with the golden plover offsetting areas. These areas will be maintained as vegetation-free (i.e. less than 2m in height) by hand or other mechanical means as appropriate throughout the operational life of the Proposed Wind Farm. This ensures that no new edge habitats or linear features develop within the buffer zone that could attract bat activity towards turbine locations. Should it prove impracticable to maintain the required buffer condition in any location, alternative mitigation measures,		

			including turbine curtailment and/or other measures informed by updated bat activity data, carcass searches and best practice guidance, will be developed and implemented to maintain an equivalent level of protection for bats. Blade Feathering NIEA Guidelines also recommend that, in addition to buffers applied to habitat features, all wind turbines are subject to 'feathering' of turbine blades when wind speeds are below 3m/s, the cut-in speed of the Proposed Turbines. This means that the turbine blades are pitched at 90 degrees or parallel to the wind to reduce their rotation speed to below two revolutions per minute while idling. This measure has been shown to significantly reduce bat fatalities (by up to 50%) in some studies (NIEA, 2021). Blade feathering below the turbine cut-in speed is expected to be implemented automatically through the turbine control system. Feathering will be limited to periods and locations as follows: › Seasonal Application: Feathering will be applied at all Proposed Turbine locations during the main bat activity season (typically April–October) between dusk and dawn only when wind speeds are below the below the cut in speed and there is less than 0.5mm/hr of rain fall. This is when bats are active and at potential increased risk of collision for the duration of the operational life of the wind farm. Blade feathering will not be applied during winter months (November - March) when bats are largely inactive. › Spatial Targeting: Feathering will be implemented only at Proposed Turbines located in areas of high bat activity, as identified through baseline surveys. Proposed Turbines positioned in habitats unsuitable for bats (e.g., extensive bare peat, exposed upland areas with no foraging or commuting value) will not require feathering at low wind speeds. Section 5.1.2 of Appendix 6-2 outlines areas which recorded high bat activity for high collision risk bat species.		

			Should any variations in activity, significant fatalities be recorded or risk levels be identified during post-construction monitoring, turbine specific adjustments will be implemented which could include increasing the cut-in speed i.e. curtailment. In the event that blade feathering is not available for the selected turbine model, an equivalent operational measure will be implemented to ensure that the Proposed Turbines do not rotate at low wind speeds when electricity generation is not occurring. This may include operational controls such as manual stop or stop-on-demand procedures during periods when the Proposed Turbines would otherwise idle below cut-in speed.		
MM60	Habitats	EIAR Chapter 6, 9 Appendix 6-5	**Aquatic Habitats** The following mitigation measures will be strictly adhered to during the works within the Proposed Wind Farm site: › Clear-span bridge crossings will be designed to span the watercourse without disturbance to the watercourse bed and with abutments located outside the channel where practicable; › Where bottomless culverts are proposed, the natural watercourse bed will be retained through the crossing where practicable. Construction will be undertaken from outside the channel. › Where box culverts or pipes are proposed, the crossing will be suitably sized for the expected peak flows and designed to maintain hydraulic conveyance. Any works required within or immediately adjacent to the watercourse will be undertaken in accordance with the relevant OPW and IFI requirements. › Existing crossings requiring upgrading or replacement will be constructed in a manner that minimises disturbance to the existing watercourse and its banks. Where existing structures are to be removed, works will be undertaken in accordance with the approved construction methodology. › All guidance / mitigation measures required by the OPW and/or the IFI is incorporated into the design of the proposed crossings. › All drainage measures will be installed in advance of the works. › Plant and equipment will not be permitted to track across the watercourse.		

			› Access to the opposite side of the watercourse for excavation and foundation installation will require the installation of a temporary pre-cast concrete or metal bridge. › As a further precaution, near stream construction work, will only be carried out during the period permitted by IFI for in-stream works according to the IFI (2016) guidance document '*Guidelines on protection of fisheries during construction works in and adjacent to waters*[3]', i.e., July to September inclusive. This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI). › All in-stream works will be undertaken in line with IFI (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters and OPW (2019) Environmental Guidance: Drainage Maintenance and Construction[4]. › All in-stream works will be supervised by an ECoW, who will have the power to halt works if non-compliance is observed. › All operatives will be trained in how to address the environmental risks and best practice measures. › In accordance with OPW (2019), in order to accommodate lamprey spawning and berried, white-clawed crayfish (i.e. carrying eggs), no works may be carried out from end March to mid-July. › In order to minimise causing direct physical damage and mortality of species living in the riverbed, the temporary dam will be constructed using sandbags and these will be placed at an extremely slow pace, such that any animals within the vicinity of the footprint will have a chance to leave for alternative suitable areas before potentially harmful effects. › Prior to the commencement of works, Section 14 Authorisation from the Inland Fisheries Division of the Department of Environment, Climate and Communications will be obtained. Prior to the pumping out of water from the enclosure, electrofishing will be carried out within the dammed area, and any recovered aquatic individuals will be relocated by the ECoW to suitable similar river habitat downstream of the works location, under licence.		

[3] IFI (2016) Guidelines on the Protection of Fisheries During Construction Works and Adjacent to Waters. Inland Fisheries Ireland.
4 Brew, T., Gilligan, N., 2019, Environmental Guidance: Drainage Maintenance and Construction. Series of Ecological Assessments on Arterial Drainage Maintenance No 13. Environment Section, Office of Public Works, Trim, Co. Meath, Ireland.

			› Only after electrofishing is complete and any fish species are removed, if present, may the water from within the dammed area begin to be pumped out from within this temporary works area. › Machinery, construction equipment and construction materials will not enter the water; the works will only occur after the dry working area is created. › All machinery, PPE and equipment used within the watercourse will be thoroughly cleaned and disinfected using a broad-spectrum cleaner (e.g. 1% solution of Virkon Aquatic or another proprietary disinfection product) prior to entering the watercourse and after removal from the watercourse to ensure biosecurity is upheld and limit the spread of invasive species and infectious waterborne diseases. This will occur within a designated wash-down area, which will be underlain by a washable membrane or hard surface. **Raised Bog** The Proposed Project has been deliberately designed to minimise the loss of uncut raised bog within the Project Site, with only the proposed amenity boardwalk in the southernmost area of Ballydermot South Bog located within this habitat. While no significant effects are anticipated as a result of this boardwalk, it will be installed using sensitive methodologies in order to ensure that no accidental loss of or excessive disturbance to this habitat will occur. The boardwalk will be installed above the raised bog which will be supported on timber piles driven into position by hand or using lightweight/low pressure mechanical means to reduce ground disturbance. **Cutover Bog and Associated Secondary Habitats** A BMP has been prepared for the Proposed Project which provides for the ecological enhancement of an area of approximately 263.8ha of cutover bog through drain blocking and rewetting measures. This will help to raise the water table and promote the development of wetland vegetation. The areas proposed for enhancement measures are located in four blocks (labelled A-D, see Figure 6-5-2 of the BMP, Appendix 6-5) located in Ballydermot North, Codd 1, Codd 2 and Ticknevin Bogs, sensitively designed around the peripheries of the Project Site in order to prevent ornithological conflicts with the Proposed Wind Farm during operation. The areas proposed for peatland enhancement have been heavily drained through the insertion of parallel drains and extensively cutover during the peat extraction phase of the Allen Bog Group and are currently largely dominated by bare peat.		

			Additionally, the BMP prescribes the management and enhancement of approximately 339ha of Lodge Bog. This will involve a range of measures, including scrub removal and management, the creation of permanent waterbodies as well as the creation of permanent reed beds. These measures are primarily proposed to serve breeding and wintering bird populations within the Project Site, as described in Chapter 7 Birds of the EIAR, however these measures will also result in the creation of additional areas of reed and large sedge swamp and poor fen communities where water levels and vegetation are to be managed. Furthermore, an area of approximately 58ha of conifer plantation within Killina Bog will be cleared in order to create open habitat suitable for golden plover. This will involve the permanent removal of the existing forestry, and the area will be allowed to revert to peatland habitat, which will be aided by the blocking of forestry drainage channels where appropriate.		
MM61	Flora and Fauna	EIAR Chapter 6	**Flora** The following mitigations will be applied during the construction phase of the Proposed Project in order to ensure that there are no significant effects on populations of these species: › Pre-commencement surveys for basil thyme and round-leaved wintergreen will be undertaken at the optimal time of year (i.e. July to August for basil thyme and June to July for round-leaved wintergreen) by a suitably qualified ecologist in advance of construction and any felling measures. The surveys will focus on the footprint of the Proposed Project (inclusive of the enhancement areas in Killina Bog) within the part of the Project Site located within part of the Allen Bog Group where the species have previously been recorded. Due to the time that may elapse between surveys undertaken to inform this assessment and the commencement of construction works, as well as the annual life cycle of basil thyme, other areas of suitable habitat within the Proposed Project construction footprint, in proximity to previously mapped populations, will also be surveyed for newly colonised plants. › If these species are found within the construction footprint, plants will be mapped.		

			› Where the species are identified within the Proposed Project footprint, the ecologist will also identify suitable translocation areas for each species outside of the construction footprint and beyond the Zone of Influence (ZoI) of the Proposed Project. <u>Basil thyme:</u> › Existing plants identified within the Proposed Project infrastructure footprint will be carefully excavated by hand by the ECoW with a shovel ensuring that the root system and surrounding rooting substrate remain intact. These plants will be moved to a prepared area outside the construction footprint with suitable substrate and habitat conditions for the calcicole species, as identified by the ECoW during the pre-commencement survey. › As this is an annual species, subsoil with the seedbank will also be translocated out of the Proposed Project footprint. Following the removal of the plants, the gravel/subsoil from these areas within the Proposed Project infrastructure footprint will be stripped and reinstated at proposed new suitable locations. The locations of the reinstatement areas will be identified by a suitably qualified ecologist in advance of reinstatement works. During reinstatement a thin layer of the stripped gravel/subsoil, containing the residual floral seed bank, shall then be spread evenly over gravel substrate. These works will be supervised by the ECoW. › These areas shall then be temporarily fenced off and allowed to regenerate naturally. <u>Round-leaved wintergreen</u> › As round-leaved wintergreen is a perennial species, large turves containing the plants identified and mapped during the pre-commencement surveys which overlap the construction footprint will be translocated as follows: › Translocation will be planned during a metabolically less active time of year for round-leaved wintergreen (winter months). › These turves will be relocated to other suitable habitat nearby with appropriate levels of shading, an appropriate hydrological regime and appropriate substrate for the species. › The receptor site will be appropriately prepared for receiving the turves by removing no more than 10cm of topsoil from the receptor areas.		

			Otter No otter holts were recorded within 150m of any Proposed Project infrastructure during any of the surveys undertaken. However, it is noted that this is a mobile species and otter could potentially migrate within the Project Site. As such, prior to the commencement of construction works associated with the installation of watercourse crossings, a pre-commencement otter survey will be undertaken to ensure that no otter holts'/breeding sites have been established since the original surveys undertaken (TII, 2008b). This will be undertaken by a suitably qualified ecologist in accordance with standard best practice guidance. In the unlikely event that an otter holt is identified within the ZoI of the Proposed Project infrastructure, or within Lodge Bog, consultation will be undertaken with the NPWS and a derogation licence applied for, in line with TII (2008b) *Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes*. › All conditions of a derogation licence will be implemented in full. › No works will be undertaken within 150m of any holts at which breeding females or cubs are present. › No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance will not take place within 15m of such holts, except under licence › All of the above works will be undertaken or supervised by an appropriately qualified ecologist. **Badger** › To protect individual badgers during the construction phase of the Proposed Project, all open excavations on site will be covered when not in use and backfilled as soon as possible. Excavations will also be covered at night and any deep excavations left open will have appropriate egress ramps in place to allow mammals to safely exit excavations should they fall in.		

			› Due to the time that may elapse between the surveys undertaken to inform this assessment and the commencement of construction works, a pre-construction badger survey of the Proposed Project footprint and adjacent areas will be carried out by a qualified ecologist to determine whether any setts have been established in the intervening period. This will include a 50m buffer of all infrastructure, a 150m buffer of any areas where piling works are proposed, such as Proposed Turbine bases, as well as areas where felling is proposed (i.e. within the Proposed Enhancement Areas). All setts identified within this Biodiversity Chapter will also be re-surveyed in order to establish their status prior to the commencement of construction works, and to identify any additional sett entrances which may have been excavated in the intervening period. › All badger setts will be afforded protection in line with the requirements set out in TII (2006) *Guidelines for the Treatment of Badger Prior to the Construction of National Roads Schemes*. An exclusion zone around all identified setts will be maintained for the duration of the construction works. No works will be undertaken within 30m of any badger setts at any time, and during the breeding season (December to June inclusive) no works will be undertaken within 50m of active setts or pile driving within 150m of active setts. If such works are required, exclusion measures will be put in place prior to construction in line with TII (2006) to ensure that the sett is evacuated. Should a badger sett require exclusion, the following steps will be undertaken to ensure that no badgers are present within the sett during construction works, in line with TII (2006): › Early consultation with the NPWS will be undertaken in advance of any works. › The closure and subsequent destruction of a sett may only be carried out following successful evacuation and must be undertaken under the supervision of suitably qualified and experienced personnel. › Exclusion from an active sett should only be undertaken during the period July to November (inclusive), in order to avoid the badger breeding season.		

			› Standard exclusion methodology involves the installation of one-way gates at all active entrances, followed by a minimum monitoring period of 21 days (commencing after an initial settling period of approximately three days), to confirm that no badgers remain within the sett. An ecologist will monitor the gates every 3 to 5 days during t 21-day period to ensure badgers do not succeed in re-entering the sett. › Immediately following this and subject to successful exclusion, the sett may then be closed under supervision. › If badgers succeed in re-entering during the 21-day period, the exclusion process and 21-day period must start again. › A post-works report detailing the exclusion methodology, monitoring results, sett excavation and closure, and any other relevant observations will be submitted to the NPWS. **Other Non-volant Mammals** Due to the time that can elapse between the original surveys, any future planning consent and construction, a pre-commencement survey for non-volant mammals will be carried out in areas of suitable habitat within the Proposed Project infrastructure footprint, and all suitable habitat within 50m of the construction footprint and within woodland and forestry felling areas associated with bat felling buffers and proposed enhancement areas. Surveys will be undertaken by suitably qualified ecologists and in line with NatureScot and TII (2008a) guidelines. **Marsh Fritillary** The Proposed Project has been designed, through an iterative design process, to avoid suitable marsh fritillary habitat where possible, based on surveys carried out in 2024 and 2025. The Proposed Project layout was thereby altered where possible to avoid loss of high-quality habitats and key breeding habitat for marsh fritillary. Consequently, all aspects of the Proposed Project are located over 150m from Lullybeg Nature Reserve and over 60m from the nearest key supporting habitat outside the reserve.		

			Construction and felling/scrub clearance works will occur in areas overlapping as well as in proximity to identified marsh fritillary-populations on the Project Site. The following mitigations will be applied during the construction phase: › A pre-commencement survey for marsh fritillary larval webs will be undertaken at the optimal time of year in advance of construction (in line with 2008a) within all areas of marsh fritillary suitable habitat within and adjacent to the footprint of the Proposed Project. › If active larval webs are recorded within the construction or felling footprint, these webs will be translocated by the ECoW to adjacent suitable existing foraging habitat outside of the construction footprint and the ZoI of the Proposed Project. This will be achieved by translocating a sod of earth with entire, intact devils' bit scabious plants upon which the larvae are feeding. › Larval webs and associated food plants will only be translocated by the ECoW to existing breeding areas as shown in Confidential Appendix 6-5. › ECoW supervision will be required for construction of components near existing breeding areas. › Where suitable marsh fritillary habitat occurs in close proximity to Proposed Project infrastructure, side casting of material will be to the opposite side of the Proposed Project infrastructure to where the suitable habitat occurs. All of the above works will be undertaken or supervised by an appropriately qualified ecologist.		
MM62	Invasive Species	EIAR Chapter 6 Appendix 4-4	The following best practice biosecurity measures will be in place during construction of the Proposed Project to avoid the introduction of invasive species to the Project Site: › Good construction site hygiene will be employed to prevent introduction of problematic invasive alien plant species (e.g., Japanese knotweed, Rhododendron, Giant Rhubarb, etc.) to the site by thoroughly washing vehicles at designated off-site wheel-wash facilities prior to entering the Project 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.		
Operational Phase					
MM63	Bats	EIAR Chapter 6 Appendix 6-2	A range of embedded and site-specific mitigation measures will be implemented to reduce operational collision risk and maintain low operational risk at the Project Site. These are fully outlined within the Bat Report (see Appendix 6-2) and include: › Implementation of bat felling buffers around all turbines in accordance with NatureScot (2021), NIEA (2021) and BCI (2026), such that habitat features used by bats are maintained outside the turbine risk zone. › Management of vegetation within turbine buffer zones to prevent the development of features that could function as commuting routes or attractive foraging habitat close to turbines. › Implementation of blade feathering at Proposed Turbines located in areas of high bat activity, as identified through baseline surveys, during periods below cut-in speed. › Implementation of a sensitive operational lighting strategy, including directional, low-intensity, warm-spectrum lighting, maintenance of dark corridors, and avoidance of light spill onto treelines, hedgerows and other boundary habitats. › Implementation of habitat enhancement measures under the BMP, including approximately 45.3ha of native woodland planting. › These measures represent embedded and site-specific operational mitigation and are designed to reduce collision risk and maintain bat activity away from turbine risk zones. › A bat monitoring and mitigation strategy has also been devised in line with Appendix 5 of NatureScot (2021). Should Year 1 post-construction monitoring identify significant bat fatalities, a curtailment protocol will be implemented. This would be tailored to site-specific seasonal and species-specific patterns and may include curtailment based on wind speed thresholds, weather-based triggers, and increased buffer zones as required.		
Decommissioning Phase					

MM64	Decommissioning Phase	EIAR Chapter 6 Appendix 4-7	Regarding Biodiversity at the Project Site, the decommissioning phase will involve the following best practice mitigation measures: › All measures to mitigate the risks of contamination of watercourses as highlighted in Chapters 8 (Land, Soils and Geology) and Chapter 9 (Water) of the EIAR will be fully implemented. › The areas within 50m of the hard-stand and turbine foundations will be subject to a pre-works terrestrial ecology walkover to highlight any constraints that may be present (e.g. breeding or resting places of protected species, presence of Invasive Plant Species, etc.). If any significant constraints are identified appropriate controls will be developed and integrated into the live decommissioning plan ahead of the commencement of work. › If any Third Schedule Invasive species are present in or adjacent to the works footprint, an Invasive Species Management Plan (ISMP) will be developed, and all recommendations implemented in accordance with the contemporary best practice measures. › Speed limits will be enforced on internal roads. › The works of the decommissioning will utilise existing roads. › All wastes will be stored in covered segregated containers and disposed of at licensed facilities. › No refuelling or other hydrocarbon related usage will be undertaken within 50m of any watercourse in relation to maintenance vehicles, plant or machinery. › Any import of soil or fill necessary in the decommissioning process will be from approved sources and appropriately tested or inspected to minimise the risk of import of invasive species. Only soil appropriate to the site (pH, soil type) will be used. The re-seeding or natural revegetation of reinstated areas will proceed on the advice of a suitably qualified ecologist. Any seed mix used will be on the approval of the ecologist.		
EIAR Chapter 7: Ornithology					
Pre-Construction/Construction Phase					
MM65	Design of the Proposed Project	EIAR Chapter 7	› Hard standing areas have been designed to the minimum size necessary to accommodate the turbine model that is selected.		

		Appendix 7-6	› The Proposed Grid Connection routes have been selected to utilise built infrastructure for the majority of its length (i.e. cables to be laid within public roads). Cables will be laid underground to avoid effects on roadside hedgerows and disturbance to nesting birds. › Following best practice, the 0.12km of OHL will include line markers to increase their visibility to bird in flight. › An initial assessment of the possibility of removing turbines from the Proposed Wind Farm was considered to avoid significant collision risk impacts on golden plover. However, given that flight activity of golden plover is throughout the Core Ornithology Survey Area, no specific turbine/turbines are the cause of the significant effect. The significant effect is largely related to the scale of the Proposed Wind Farm and the presence of suitable roosting habitat for golden plover throughout the Core Ornithology Study Area. Therefore, avoiding the cause of the significant collision risk through project design and turbine layout was not a feasible option (see details in Appendix 7-6). Mitigation and offsetting measures are therefore proposed within the Biodiversity Management Plan. › The Proposed Onsite Substation was sited outside the disturbance distance of 800m (830m separation distance) from the historic curlew nest adjacent to the Core Ornithology Study Area.		
MM66	Construction and Environmental Management Plan	EIAR Chapter 7, 9, 12 Appendix 7-7	› Works will commence outside the bird nesting season (1st of March to 31st of August inclusive). Any requirement for construction works to run into the breeding seasons following commencement will be informed by pre-construction bird surveys. › 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. › During the construction phase, noise limits, noise control measures, hours of operation (i.e. dusk and dawn is high faunal activity time) and selection of plant items will be considered in relation to disturbance of birds. Please see Section 12.7 of Chapter 12 for more detail associated with noise during the construction phase. › Water protection measures will be implemented during the construction phase as outlined in Section 9.5.2 of Chapter 9, to protect downstream watercourses.		

			❯ A pre-construction bird survey at the Proposed Wind Farm 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. ❯ An Environmental Clerk of Works and Project Ecologist will be appointed. Duties will include: ○ Organise the undertaking of pre-construction and construction phase confirmatory bird surveys to avoid impacts on birds. ○ Inform and educate on-site personnel of the ornithological and ecological sensitivities within the Project Site. ○ Oversee management of ornithological issues during the construction period and advise on ornithological issues as they arise. ○ Provide guidance to contractors to ensure legal compliance with respect to protected species onsite. ○ Liaise with officers of consenting authorities and other relevant bodies with regular updates in relation to construction progress as necessary. ○ If winter roosting or breeding activity of birds of high conservation concern are identified, the roost or nest site will be located and no works shall be undertaken within a species-specific disturbance buffer in line with industry best practice (e.g. Goodship and Furness, 2022). No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied.		
MM67	Birds	EIAR Chapter 7 Appendix 6-5	**Golden Plover** ❯ Collision risk: to mitigate significant collision risk effects it is proposed to make the habitat near the Proposed Turbines unsuitable, attract golden plover to low risk areas away from the Proposed Turbines and monitor collision risk. If collision rates exceed a set threshold, curtailment would apply. Please see Appendix 6-5 for full details of how this mitigation will be implemented. ❯ Curtailment: Carcass monitoring and vantage point monitoring surveys will inform curtailment requirements. In the event that golden plover mortality caused by the Proposed Turbines exceeds ten birds per winter season, the turbines determined most likely to have caused these fatalities will curtailed for the remainder of the winter season. Monitoring will be repeated every winter with the results of each winter informing		

			curtailment for that season. The threshold of ten birds was determined to be sufficient to reduce the collision risk on the local population to Not Significant. › Habitat loss: to offset the significant habitat loss effect, habitat restoration and creation is proposed. This enhancement is proposed at Lodge Bog, and the creation of habitat is proposed at Killina Bog. Please see Appendix 6-5 for full details of how this will be implemented. **Hen Harrier** › Displacement: to offset significant displacement effects from the Proposed Turbines, habitat restoration and creation is proposed at Lodge Bog. Please see Appendix 6-5 for full details of how this will be implemented. **Whooper Swan** › Habitat loss: to offset the significant habitat loss effect habitat restoration and creation is proposed. This enhancement is proposed at Lodge Bog. Please see Appendix 6-5 for full details of how this will be implemented. › Disturbance and displacement: to offset significant disturbance effects during the construction phase and displacement during the operational phase, habitat restoration and creation is proposed to attract whooper swan away from the source of disturbance or displacement. This enhancement is proposed at Lodge Bog. Please see Appendix 6-5 for full details of how this will be implemented. **Lapwing (Breeding)** › Habitat loss: to offset the significant habitat loss effect, habitat restoration and creation is proposed. This enhancement is proposed at Lodge Bog, and the creation of habitat is proposed at Killina Bog. Please see Appendix 6-5 for full details of how this will be implemented. › Disturbance and displacement: to offset significant disturbance effects during the construction phase and displacement during the operational phase, habitat restoration and creation is proposed. This enhancement is proposed at Lodge Bog, and the creation of		

			habitat is proposed at Killina Bog. Please see Appendix 6-5 for full details of how this will be implemented. **Snipe** › Disturbance and displacement: to offset significant disturbance effects during the construction phase and displacement during the operational phase, breeding habitat restoration and creation is proposed. This enhancement is proposed at Lodge Bog, and the creation of habitat is proposed at Killina Bog. Please see Appendix 6-5 for full details of how this will be implemented. **Proposed Actions** › 0-50m surrounding all turbines: to be planted with rush mosaic and rush mosaic promoted through side casting excavated soils to discourage waders (golden plover, lapwing, snipe) from flying among and around turbines with the intention of utilising open areas for foraging/roosting. The planting of rush in this buffer will reduce open areas to below 10ha while not encouraging bats to the area around the base of turbines. › 50-250m surrounding all turbines: to be planted with scrub mosaic habitat to discourage waders (golden plover, lapwing, snipe) from flying among and around turbines with the intention of utilising open areas for foraging/roosting. The planting of scrub in smaller patches (0.1-5ha) within larger open areas to fragment these open areas to below 10ha. › Lodge Bog Enhancement Area: to offset the habitats lost to the mitigation measures within 250m of all turbines, open areas will be enhanced/created through scrub removal and management, permanent waterbody creation for whooper swan, creation of breeding wader areas and installation of predator proof fencing. › Killina Offsetting Area: to offset the habitats lost to the mitigation measures within 250m of all turbines, forestry will be removed and vegetation sward will be kept at the optimal height for waders, including golden plover. Golden plover decoys will be placed in the newly created open area to draw circling flocks which look for other birds on the ground. › Monitoring of offsetting areas for alignment with objectives will be put in place and measures will be adapted as required to ensure the efficacy of mitigation for the lifetime of the project. Further detail on these actions are outlined in Appendix 6-5.		

Operational Phase					
MM68	Birds	EIAR Chapter 7 Appendix 7-7	The mitigation measures outlined in Line Items MM65 to MM67 above during the construction phase will be maintained throughout the operational phase. A Bird Monitoring Plan with the objective of monitoring the response of the ornithological community at the Proposed Wind Farm to the operating turbines and the Proposed Enhancement Areas has been prepared. This is presented fully in Appendix 7-7. The following individual components are proposed: › Monthly flight activity surveys: vantage point surveys (All species) › Winter roost surveys (hen harrier and whooper swan) › Targeted bird collision surveys (corpse search) will be undertaken with trained dogs. The surveys will include detection and scavenger trials, to correct for these two biases and ensure the resulting data is robust. It is noted that these surveys can be combined with bat carcass searches. › Vegetation monitoring › Predator proof-fence inspections › Nest box monitoring		
Decommissioning Phase					
MM69	Decommissioning	EIAR Chapter 7 Appendix 4-7	› It is proposed that decommissioning works will commence outside the bird nesting season (1st of March to 31st of August inclusive) to avoid the most sensitive time of the year for most bird species with the potential to use the site and its environs. › Decommissioning surveys will be undertaken prior to the initiation of works at the Wind Farm Site. The survey will aim to identify sensitive sites (e.g. nests or roosts). Any requirement for decommissioning works to run into subsequent breeding or winter seasons following the commencement of works will be subject to a repeat of the decommissioning bird surveys. › Monitoring will be undertaken by a suitably qualified ornithologist. The survey will include a thorough walkover survey to a 500m radius of the development footprint and/or		

			all works areas. If winter roosts or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located and earmarked for monitoring at the beginning of the first winter or breeding season of the construction phase. If the roost/nest is found to be active during the decommissioning phase no works shall be undertaken, works will cease within a species-specific buffer of this location (Forestry Commission Scotland, 2006; Goodship and Furness 2022; Ruddock and Whitfield, 2007) in line with best practice. No works shall be permitted within the buffer until it can be demonstrated that the roost or nest is no longer occupied. › All site staff and subcontractors will be made aware of any restrictions to be imposed by means of a toolbox talk and a map of the 'no-work zone' will be made available to all decommissioning staff. The restricted area will also be marked off using hazard-tape fencing to alert all personnel on site to the suspension of works within that area.		
EIAR Chapter 8: Land, Soils and Geology					
Construction Phase					
MM70	Peat and Subsoil Excavation	EIAR Chapter 4, 8	› Placement of Proposed Turbines and associated infrastructure in areas with shallower peat where constraints allow; › Use of floating roads (approximately 56.6km), where appropriate, to reduce peat excavation volumes; › The peat and spoil which will be removed during the construction phase will be transported immediately on excavation to designated peat and spoil areas alongside the hardstands and access roads or used for landscaping; › The Proposed Project has been designed to avoid sensitive habitats; › A minimal volume of peat and subsoil will be removed to allow for infrastructural work to take place in comparison to the total volume present due to optimisation of the layout by mitigation by design; › Excavated peat and spoil will only be moved short distances from the point of excavation and will be used locally for landscaping; › Excavated peat and spoil that is not used locally for landscaping will be stored in the designated peat and spoil areas; and,		

			› Construction of settlement ponds will be volume neutral, and all excess material will be used locally to form pond bunds and surrounding landscaping.		
MM71	Leakages and Spillages	EIAR Chapter 4, 8 Appendix 4-4 Appendix 4-5	› Refuelling and maintenance of construction vehicles and plant will, where practicable, be undertaken off-site at controlled, designated fuelling facilities. Where refuelling or maintenance is required on-site, it will be undertaken at designated areas in accordance with the Construction Environmental Management Plan (CEMP) and appropriate pollution prevention procedures; › On-site re-fuelling will be undertaken using a double skinned bowser or a refuelling truck with spill kits kept onboard; › Only designated trained operatives will be authorised to refuel plant on-site; › Taps, nozzles or valves associated with refuelling equipment will be fitted with a lock system; › All fuel storage areas will be bunded appropriately for the duration of the construction phase. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area; › Fuel and oil stores including tanks and drums will be regularly inspected by the appointed EnvCoW for leaks and signs of damage; › The Proposed Onsite Substation and the Proposed Offsite Substation will be bunded appropriately to the volume of oils likely to be stored and to prevent leakage of any associated chemicals to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor; › The plant used during construction will be regularly inspected for leaks and fitness for purpose; and, › An emergency response plan for the construction phase to deal with accidental spillages is contained within the CEMP (which is contained in Appendix 4-4).		
MM72	Erosion of Exposed Subsoils and Peat	Chapter 8 Appendix 4-3	› All works will be completed in accordance with the Peat and Spoil Management Plan (FTC, 2026); › All excavated peat and spoil will be transported immediately on excavation to designated peat and spoil areas along the access roads and will be used on site for landscaping close to the extraction area;		

			› Peat and spoil will not be transported further than the minimum distance required to facilitate their appropriate placement within the designated peat and spoil areas, in accordance with the Peat and Spoil Management Plan (FTC, 2026b); › Upon excavation, the upper vegetative layer (where still present) will be stored with the vegetation part of the sod facing the right way up to keep the plants and vegetation alive to aid construction reinstatement of disturbed ground; and, › Re-seeding and spreading/planting will also be carried out in areas where ground will be disturbed.		
MM73	Peat Instability and Failure	EIAR Chapter 8 Appendix 8-1	The following general control measures incorporated into the construction phase of the Proposed Project will assist in the management of the risks: › Appointment of experienced and competent contractors; › Works will be supervised by experienced and qualified personnel; › Allocate sufficient time for the construction of the Proposed Project (be aware that decreasing the construction time has the potential to increase the risk of initiating a localised peat movement); › Prevent undercutting of slopes and unsupported excavations; › Maintain a manage a robust drainage system; › Prevent placement of loads/overburden on marginal ground; › Set up, maintain and report findings from monitoring systems (as outlined in the GPSRA); › Ensure construction method statements are developed and agreed before commencement of construction and are followed by the contractor; and, › Revise and amend the Construction Risk Register as construction progresses to ensure that risks are managed and controlled for the duration of construction.		
MM74	Proposed Onsite Substation and Proposed Offsite Substation	EIAR Chapter 8	› Mitigation measures in respect of peat and subsoil excavation are detailed in Line-Item MM70 above › Mitigation measures to prevent soil / subsoil contamination (leaks / spills) are dealt with in in Line-Item MM71 above; and, › Mitigation measures dealing with soil erosion are dealt with in Line-Item MM72 above		

MM75	Amenity Proposals	EIAR Chapter 4, 8	› Mitigation measures in respect of peat and subsoil excavation are detailed in Line-Item MM70 above › Mitigation measures to prevent soil / subsoil contamination (leaks / spills) are dealt with in in Line-Item MM71 above; and, › Mitigation measures dealing with soil erosion are dealt with in in Line-Item MM72 above		
MM76	Proposed Turbine Delivery Route Accommodation Works	EIAR Chapter 15, 8	› Mitigation measures in respect of peat and subsoil excavation are detailed in Line-Item MM70 above › Mitigation measures to prevent soil / subsoil contamination (leaks / spills) are dealt with in in Line-Item MM71 above; and, › Mitigation measures dealing with soil erosion are dealt with in in Line-Item M72 above.		
MM77	Proposed Enhancement Areas	EIAR Chapter 6, 8 Appendix 6-5	› Mitigation measures in respect of peat and subsoil excavation are detailed in Line-Item MM70 above › Mitigation measures to prevent soil / subsoil contamination (leaks / spills) are dealt with in in Line-Item MM71 above; and › Mitigation measures dealing with soil erosion are dealt with in in Line-Item MM72 above.		
MM78	Proposed Grid Connection OHL Loop in Connection	EIAR Chapter 8	› Mitigation measures in respect of peat and subsoil excavation are detailed in Line-Item MM70 above › Mitigation measures to prevent soil / subsoil contamination (leaks / spills) are dealt with in in Line-Item MM71 above; and, › Mitigation measures dealing with soil erosion are dealt with in in Line-Item MM72 above.		
MM79	Karst	EIAR Chapter 8	In the unlikely event that a previously unidentified karst feature is encountered the following procedures (Karst Protocol) will be implemented: › All work will be stopped in the area where a karst feature is suspected; › The area will be secured to ensure the safety of workers and plant;		

			› The Project Engineering Geologist will be notified, and the feature will be investigated to determine its nature, size, extend and/or significance; › Appropriate mitigation measures (in relation to ground stability and water quality protection) will be developed in consultation with geotechnical specialists and the project hydrologist/hydrogeologist; and, › No work will recommence in the area until written approval is obtained from the relevant project personnel.		
Operational Phase					
MM80	Site Road Maintenance	EIAR Chapter 8	› Use of aggregate from authorised quarries, operating in accordance with the applicable planning and environmental requirements, for use in road and hardstand maintenance.		
MM81	Site Vehicle/Plant Use	EIAR Chapter 4, 8 Appendix 4-4	› Vehicles used during the operational phase will be refuelled off site before entering the Project Site; › Vehicles will be inspected prior to entering the Project Site to ensure that they are in good working order and that there are no leaks; › No fuels will be stored onsite during the operational phase; › Spill kits will be available in all site vehicles to deal with an accidental spillage and breakdowns; and, › An emergency plan for the operational phase to deal with accidental spillages and breakdowns will be contained in the finalised CEMP (Appendix 4-4).		
MM82	Use of Oil in Turbine Transformers	EIAR Chapter 4, 8 Appendix 4-4	› The electrical control building (at the Proposed Onsite Substation and Proposed Offsite Substation) will be bunded appropriately to the volume of oils likely to be stored and to prevent leakage of any associated chemicals to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor; › All transformer areas at the turbines will be bunded to 110% of the volume of oil used in each transformer; › All equipment at the substations will be inspected and regularly serviced as per the manufacturer's guidelines; and, › An emergency plan for the operational phase to deal with accidental spillages will be contained in the CEMP (Appendix 4-4).		

Decommissioning Phase					
MM83	Decommissioning Phase	EIAR Chapter 8	› The potential impacts associated with decommissioning of the Proposed Project will be similar to those associated with construction but of reduced magnitude. › Mitigation measures applied during decommissioning activities will be similar to those applied during construction where relevant. › Mitigation measures to avoid contamination by accidental fuel leakage and compaction of soil by on-site plant will be implemented as per the construction phase mitigation measures.		
EIAR Chapter 9: Water					
Pre-Construction Phase					
MM84	Temporary Drainage Works	EIAR Chapter 4, 9 Appendix 4-4	› All new proposed culverts and proposed culvert upgrades at field drain crossings required for the Proposed Wind Farm will be suitably sized for the expected peak flows in the watercourse. › All culverts will be inspected regularly to ensure they are not blocked by debris, vegetation or any other material that may impede conveyance.		
Construction Phase					
MM85	Earthworks Resulting in Suspended Solids Entrainment in Surface Waters	EIAR Chapter 4, 9 Appendix 4-3 Appendix 4-4	**Proposed Mitigation by Avoidance** The key mitigation measure during the construction phase is the avoidance of sensitive hydrological features where possible, by application of suitable buffer zones (i.e. 50m to main watercourses, and 10m to main drains). The majority of the Proposed Project development areas are located away from the delineated 50m watercourse buffer zones with the exception of the upgrading of the existing watercourse crossing, new drain crossing and upgrades to existing site access tracks and the small hydrological feature to the southwest of the Proposed Offsite Substation. Works within the hydrological buffer zones comprise of new and proposed		

		Appendix 4-5	watercourse crossings, sections of access roads to the south of T37 (930m of access road) and in the south of Lodge Bog (130m access road) and crane hardstands associated with T36 and T38. Additional mitigation measures are prescribed for these areas. The large setback distance from sensitive hydrological features means that adequate room is maintained for the proposed drainage mitigation measures to be properly installed and operate effectively. The proposed buffer zone will: › Avoid physical damage (river/stream banks and river/stream beds) to watercourses and associated release of sediment; › Avoid excavations within close proximity to surface watercourses; › Avoid the entry of suspended sediment from earthworks into watercourses; and, › Avoid the entry of suspended sediment from the construction phase drainage system into watercourses, achieved in part by ending drain discharge outside the buffer zone and allowing percolation across the vegetation of the buffer zone. In addition, and as outlined above, the drainage systems for the Proposed Wind Farm and Proposed Onsite Substation will connect into the existing bog drainage network. Runoff will be conveyed through the existing field drains and main drains to the existing large IPC licenced settlement ponds, where it will undergo further settlement and attenuation prior to discharge from the bog. The nearest IPC licenced settlement pond is located ~160m from the nearest turbine. As such, there is significant distance for wind farm related surface water to travel before it actually reaches the edge of the bogs and joins any receiving waters outside of the overall bog boundaries. **Proposed Mitigation by Design** There is an extensive network of drains already existing at the Proposed Wind Farm site. The existing drainage infrastructure is operating in accordance with IPC licence requirements, with environmental monitoring and silt control measures being implemented. The existing drainage system at the bogs will be maintained and expanded locally as required for use within the Proposed Project drainage system. The key elements are the upgrading and improvements to		

			water treatment elements, such as in-line controls and treatment systems, including wind farm related silt traps and settlement ponds. The elements of interaction with existing drains will be as follows: › Interceptor drains will convey clean runoff water around works areas to the existing downstream drainage system (field drains and main drains). Where required, interceptor drains will be installed in advance of any construction works commencing. This will ensure that clean water is kept clear by diverting surface water flow around excavations, construction areas and temporary storage areas. Where possible (depending on orientation), existing field drains can be used as interceptors drains; › Collector drains will be used to intercept and collect runoff from construction areas (from turbine base/hardstand areas, construction compounds, and the substation). During the construction phase temporary settlement ponds will be used to attenuate and treat runoff from the construction areas (from turbine base/hardstand areas, construction compounds, and the Proposed Onsite Substation) and treated water will then discharge into existing field drains and main drains. Temporary settlement ponds will be removed at the end of the construction phase (end of high-risk period), and operating wind farm runoff will discharge into existing field drains and main drains; › During the construction phase, temporary silt traps (silt fences) will be used as an additional water protection measure around the existing bog drainage network, particularly where works are proposed within 50m of a natural watercourse. The silt fences will be placed in the existing drains downstream of construction works, and the associated construction area run-off water will be diverted into proposed interceptor drains, or culverted under/across the works area; › During the construction phase, dewatering silt bags will also be used as required. They can be used downgradient of Proposed Turbine bases, where temporary pumping is required. Discharge from dewatering silt bags will flow into settlement ponds and treated water from settlement ponds will outfall to existing field drains and main drains;		

			› With regards to the proposed floating roads, and depending on intermediate topography, a collector drain (dirty water system as described above) may be used during construction stage, or over the edge (OTE) drainage will occur. OTE drainage allows runoff from access tracks to flow into local field drains and be managed via the existing site drainage system. OTE drainage will only occur where topography allows, and it is only proposed in areas of low risk and remote from outfall locations (at least 150m from bog outfall locations. Silt traps and check dams will be installed in field drains downstream of OTE drainage areas, and these will provide attenuation and treatment of dirty water; and, › Culverts will be required where site roads and proposed hardstands cross the main bog drainage networks. These will be installed with a minimum gradient to reduce the entrainment of suspended solids. All culverts will be inspected regularly and maintained where appropriate. Culverts will remain in-situ during the operational phase of the Proposed Project. **Water Treatment Drain:** If the discharge water from construction areas fails to be of a high quality, then a filtration treatment system (such as a 'Siltbuster®' or similar equivalent treatment train (sequence of water treatment processes)) will be used to filter and treat all surface discharge water collected in the dirty water drainage system. This will apply for all of the construction phase. **Silt Fences:** Silt fences will be emplaced within drains down-gradient of all construction areas. Silt fences are effective at removing heavy settleable solids. This will act to prevent entry to the existing drainage network of sand and gravel-sized sediment, released from excavation of mineral sub-soils of glacial and glacio-fluvial origin and entrained in surface water runoff. Regular inspection and maintenance of these structures during construction phase is critical to their functioning to stated purpose. They will remain in place throughout the entire construction phase. **Silt Bags:**		

			Silt bags will be used where small to medium volumes of water need to be pumped from excavations (e.g. the proposed underpass locations). As water is pumped through the bag, most of the sediment is retained by the geotextile fabric allowing filtered water to pass through. **Pre-emptive Site Drainage Management:** The works programme for the construction stage of the development will also take account of weather forecasts and predicted rainfall in particular. Large excavations and movements of peat/subsoil or peat stripping will be suspended or scaled back if heavy rain is forecast. The extent to which works will be scaled back or suspended will relate directly to the amount of rainfall forecast. The following forecasting systems are available and will be used on a daily/weekly basis, as required, to allow site staff to direct proposed and planned construction activities: › General Forecasts: Available on a national, regional and county level from the Met Éireann website (www.met.ie/forecasts). These provide general information on weather patterns including rainfall, wind speed and direction but do not provide any quantitative rainfall estimates; › MeteoAlarm: Alerts to the possible occurrence of severe weather for the next 2 days. Less useful than general forecasts as only available on a provincial scale; › 3-hour Rainfall Maps: Forecast quantitative rainfall amounts for the next 3 hours but does not account for possible heavy localised events; › Rainfall Radar Images: Images covering the entire country are freely available from the Met Éireann website (www.met.ie/latest/rainfall_radar.asp). The images are a composite of radar data from Shannon and Dublin airports and give a picture of current rainfall extent and intensity. Images show a quantitative measure of recent rainfall. A 3-hour record is given and is updated every 15 minutes. Radar images are not predictive; and, › Consultancy Service: Met Éireann provide a 24-hour telephone consultancy service. The forecaster will provide interpretation of weather data and give the best available forecast for the area of interest.		

			Using the safe threshold rainfall values will allow planned works to be safely executed (from a water quality perspective) in the event of forecasting of an impending high rainfall intensity event. Earthworks will be suspended if forecasting suggests any of the following is likely to occur: › >10 mm/hr (i.e. high intensity local rainfall events); › >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or, › >half monthly average rainfall in any 7 days. Prior to earthworks being suspended the following control measures will be completed: › Secure all open peat/spoil excavations; › Provide temporary or emergency drainage to prevent back-up of surface runoff; and, › Avoid working during heavy rainfall and for up to 24 hours after heavy events to ensure drainage systems are not overloaded. **Management of Runoff from Peat and Spoil Areas:** All excavated peat and overburden will be placed/spread alongside the excavations for the infrastructure elements. Excavated peat and spoil will be transported immediately on excavation to designated peat and spoil areas alongside the hardstands and access roads or used for landscaping. During the initial placement of peat and spoil, silt fences, straw bales and biodegradable geogrids will be used to control surface water runoff from the storage areas as required. Interceptor and collector drains will be used at storage areas. 'Siltbuster' or similar equivalent treatment trains will be employed if previous treatment is not to a high quality. **Timing of Site Construction Works:** Construction of the onsite drainage system will only be carried out during periods of low rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of		

			suspended sediment in surface water runoff, and transport via this pathway to surface watercourses. Construction of the drainage system during this period will also ensure that attenuation features associated with the drainage system will be in place and operational for all subsequent construction works. **Proposed Drainage and Water Quality Monitoring** An inspection and maintenance plan for the onsite drainage system will be prepared in advance of commencement of any works and will be included in the CEMP (Construction and Environmental Management Plan) (Appendix 4-4). Regular inspections of all installed drainage systems will be undertaken, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water in parts of the systems where it is not intended. Any excess build-up of silt levels at dams, the settlement ponds, or any other drainage features that may decrease the effectiveness of the drainage feature will be removed. During the construction phase field testing (visual, supplemented with pH, electrical conductivity, temperature, dissolved oxygen and turbidity monitoring), sampling and laboratory analysis of a range of parameters[5] with relevant regulatory limits and EQSs will be undertaken for each primary watercourse, and specifically following heavy rainfall events (i.e. weekly, monthly and event-based). The data will be processed and analysed, and works will cease if elevated turbidity concentrations are recorded. In this event, all upstream silt traps and drainage routes will be inspected to identify the cause of the elevated turbidity levels. Works will not recommence until any issues have been resolved and the turbidity concentrations have returned to background concentrations. **Works within Buffer Zones** The following additional mitigation measures will also be implemented:		

[5] *example suite: pH (field measured), Electrical Conductivity (field measured), temperature (field measured), Dissolved Oxygen (field measured), Turbidity (NTU) (sonde measured), Flow (m/s), Total Suspended Solids (mg/L), Ammonia, Nitrite (NO_2) (mg/L), Ortho-Phosphate (P) (mg/L), Nitrate (NO_3) (mg/L), Phosphorus (unfiltered) (mg/L), Chloride (mg/L), and BOD (mg/L).*

			› Double or triple silt fences will be placed downgradient of all work locations within the hydrological buffer zones; › All works will be completed during the dry weather periods and works will be postponed in the event of rainfall; and, › The hedgerow separating the small hydrological feature to the southwest of the Proposed Offsite Substation will be retained. This feature is not shown on the EPA databases but was recorded during site surveys. The features was described as being heavily vegetated and with a low flow. Retaining the hedgerow will acts as an additional protection measure to this features.		
MM86	Surface Water Quality from Excavation Dewatering	EIAR Chapter 9	Management of excavation seepages and subsequent treatment prior to discharge into the drainage network will be undertaken for excavation works across the Project Site, as follows: › Appropriate interceptor drainage, to prevent upslope surface runoff from entering excavations will be put in place; › If required, pumping of excavation inflows will prevent the build-up of groundwater in the excavation; › The interceptor drainage will be discharged to the existing drainage system or onto natural vegetated surfaces within the Project Site and not directly to any natural watercourse; › The pumped water volumes will be discharged via volume and sediment attenuation ponds adjacent to excavation areas, or via specialist treatment systems such as a “Siltbuster®” unit; › There will be no direct discharge to the existing drainage network and therefore no risk of hydraulic loading or contamination will occur; and, › Daily monitoring of excavations and the water treatment system by a suitably qualified person (EnvCoW) will occur during the construction phase. If high levels of seepage inflow occur, excavation work will immediately be stopped, and a geotechnical assessment will be undertaken.		

			Proven and effective measures to minimise the levels of sediment from the Project Site have been proposed above and will maximise the drainage pathway length between the potential sources and the receptor.		
MM87	Leakages or Spillages of Hydrocarbons	Chapter 9	› Refuelling and maintenance of construction vehicles and plant will, where practicable, be undertaken off-site at controlled, designated fuelling facilities. Where refuelling or maintenance is required on-site, it will be undertaken at designated areas in accordance with the CEMP and appropriate pollution prevention procedures; › On-site re-fuelling will be undertaken using a double skinned bowser or a refuelling truck with spill kits kept onboard; › Only designated trained operatives will be authorised to refuel plant on-site; › Taps, nozzles or valves associated with refuelling equipment will be fitted with a lock system; › All fuel storage areas will be bunded appropriately for the duration of the construction phase. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area; › Fuel and oil stores including tanks and drums will be regularly inspected by the appointed EnvCoW for leaks and signs of damage; › The Proposed Onsite Substation and the Proposed Offsite Substation will be bunded appropriately to the volume of oils likely to be stored and to prevent leakage of any associated chemicals to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor; › The plant used during construction will be regularly inspected for leaks and fitness for purpose; and, › An emergency response plan for the construction phase to deal with accidental spillages is contained within the CEMP (which is contained in Appendix 4-4).		
MM88	Release of Cement-Based Products	EIAR Chapter 4, 9	› No batching of wet-cement products will occur on-site. Ready-mixed concrete will be delivered to site, and where possible, pre-cast elements will be used; › Where possible pre-cast elements for culverts and concrete works will be used;		

		Appendix 4-4	› No washing out of any plant used in concrete transport or concreting operations will be allowed on-site; › Where concrete is delivered on-site, only the chute will be cleaned, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water will be isolated in temporary lined wash-out pits located near proposed site compounds. These temporary lined wash-out pits will be removed from the site at the end of the construction phase; › Any washing out of concrete pumping plant will also be into the temporary lined wash-out pits; › The appointed contractor will ensure to use weather forecasting to plan dry days for pouring concrete; and, › The appointed contractor will ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event.		
MM89	Wastewater Disposal	EIAR Chapter 9	› There are a total of 10 no. proposed construction compounds associated with the Proposed Project (the locations of the compounds are detailed in Table 4-2 of Chapter 4); › During the construction phase, a self-contained port-a-loo with an integrated waste holding tank will be used at each of the site compounds, maintained by the providing contractor, and removed from site on completion of the construction works; › Water supply for the site office and other sanitation will be brought to the Project Site and removed after use from the site to be discharged at a suitable off-site treatment location; › No water or wastewater will be sourced on the Project Site, nor discharged to the Project Site.		
MM90	Piled Foundations	EIAR Chapter 9	The proposed mitigation measures designed for the protection of downstream surface water quality and groundwater quality within the Proposed Wind Farm will be implemented at all construction work areas. › Mitigation measures for sediment control are detailed in Line-Items MM85 and MM86 above.		

			› Mitigation measures for the control of hydrocarbons during construction works are detailed in Line-Item MM87 above. › Mitigation measures for the control of cement-based products during construction works are detailed in Line-Item MM88 above. › Mitigation measures in relation to wastewater are detailed in Line-Item MM89 above. Proposed mitigation measures relative to piling works will comprise: › Where driven piles are used, they will have a cross section without re-entrant angles; › Strict QA/QC procedures for piling works will be followed; › Piles will be kept vertical during piling works; › Where required a bentonite seal to prevent upward/downward movement of surface water/groundwater.		
MM91	Morphological Changes to Watercourses at the Proposed Wind Farm	EIAR Chapter 9	› Clear-span bridge crossings will be designed to span the watercourse without disturbance to the watercourse bed and with abutments located outside the channel where practicable. › Where bottomless culverts are proposed, the natural watercourse bed will be retained through the crossing where practicable. Construction will be undertaken from outside the watercourse channel and appropriate measures will be implemented to prevent the mobilisation of sediment into the watercourse; › Where box culverts or pipes are proposed, the crossing will be suitably sized for the expected peak flows and designed to maintain hydraulic conveyance. Any works required within or immediately adjacent to the watercourse will be undertaken in accordance with the relevant OPW and IFI requirements and appropriate sediment and pollution control measures will be implemented; › Existing crossings requiring upgrading or replacement will be constructed in a manner that minimises disturbance to the existing watercourse and its banks. Where existing structures are to be removed, works will be undertaken in accordance with the approved construction methodology and appropriate measures will be implemented to prevent sediment mobilisation; › All proposed new and upgraded crossings will be designed to maintain existing watercourse flow conveyance and to avoid creating a restriction to flow or increasing flood risk upstream or downstream of the crossing;		

			› All guidance / mitigation measures required by the OPW and/or the Inland Fisheries Ireland (IFI)6 is incorporated into the design of the proposed crossings; › All drainage measures will be installed in advance of the works; › Plant and equipment will not be permitted to track across the watercourse. Access to the opposite side of the watercourse for excavation and foundation installation will require the installation of a temporary pre-cast concrete or metal bridge; › As a further precaution, near stream construction work, will only be carried out during the period permitted by IFI for in-stream works according to the IFI (2016) guidance document "Guidelines on protection of fisheries during construction works in and adjacent to waters", i.e., July to September inclusive. This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI); › Where works are necessary inside the 50m buffer double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase; › All new river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent; › Existing crossings requiring upgrading or replacement will be constructed in a manner that minimises disturbance to the existing watercourse and its banks. Where existing structures are to be removed, works will be undertaken in accordance with the approved construction methodology and appropriate measures will be implemented to prevent sediment mobilisation; and, › All proposed new and upgraded crossings will be designed to maintain existing watercourse flow conveyance and to avoid creating a restriction to flow or increasing flood risk upstream or downstream of the crossing.		
MM92	Morphological Changes to Watercourses	EIAR Chapter 9	Prior to the commencement of cable trenching or crossing works the following key temporary drainage measures will be installed:		

[6] *Inland Fisheries Ireland (2016): Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters*

	along the Proposed Grid Connection		❯ A double silt fence perimeter will be placed along the road verge on the down-slope side of works areas that are located inside the watercourse 50m buffer zone; ❯ The following mitigation measures are proposed for the Proposed Grid Connection crossing works: ○ No stockpiling of construction materials will take place along the grid route; ○ No refuelling of machinery or overnight parking of machinery is permitted in this area; ○ No concrete truck chute cleaning is permitted in this area; ○ Works will not take place at periods of high rainfall, and will be scaled back or suspended if heavy rain is forecast; ○ Local road drainage, culverts and manholes will be temporarily blocked during the works; ○ Machinery deliveries will be arranged using existing structures along the public road; ○ All machinery operations will take place away from the stream and ditch banks, apart from where crossings occur. Although no instream works are proposed or will occur; ○ Any excess construction material will be immediately removed from the area and sent to a licenced waste facility; ○ Spill kits will be available in each item of plant required to complete the works; and, ○ Silt fencing will be erected on ground sloping towards watercourses at the stream crossings if required. ❯ Mitigation measures for HDD are detailed Line-item MM93.		
MM93	Horizontal Directional Drilling along the Proposed Grid Connection Underground Cabling Route	EIAR Chapter 9	❯ Although no in-stream works are proposed, the drilling works will only be done over a dry period between July and September (as required by IFI for in-stream works) to avoid the salmon spawning season and to have more favourable (dryer) ground conditions; ❯ The crossing works area will be clearly marked out with fencing or flagging tape to avoid unnecessary disturbance; ❯ There will be no storage of material / equipment or overnight parking of machinery inside the hydrological buffer zone;		

			› Before any ground works are undertaken, double silt fencing will be placed upslope of the Grand Canal; › Additional silt fencing or straw bales (pinned down firmly with stakes) will be placed across any natural surface depressions / channels that slope towards the watercourse; › Silt fencing will be embedded into the local soils to ensure all site water is captured and filtered; › The area around the bentonite batching, pumping and recycling plant will be bunded using terram (as it will clog) and sandbags in order to contain any spillages and prevent the migration of drilling fluids from the works area; › Drilling fluid returns will be contained within a sealed tank / sump to prevent migration from the works area; › Spills of drilling fluid will be cleaned up immediately and contained in an adequately sized skip before being taken off-site; › If rainfall events occur during the works, there will be a requirement to collect and treat small volumes of surface water from areas of disturbed ground (i.e. soil and subsoil exposures created during site preparation works); › This will be completed using a shallow swale and sump down slope of the disturbed ground; and water will be pumped to a proposed settlement pond area at least 50m from the Grand Canal; › The discharge of water onto vegetated ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire percolation area will be enclosed by a perimeter of double silt fencing; › Any sediment laden water from the works area will not be discharged directly to the Grand Canal or drain; › Works will not take place during periods of heavy rainfall and will be scaled back or suspended if heavy rain is forecasted; › Daily monitoring of the compound works area; the water treatment and pumping system and the percolation area will be completed by a suitably qualified person during the construction phase. All necessary preventative measures will be implemented to ensure no entrained sediment, or deleterious matter is discharged to the Grand Canal; › If high levels of silt or other contamination is noted in the pumped water or the treatment systems, all construction works will be stopped. No works will recommence until the issue is resolved and the cause of the elevated source is remedied;		

			❯ On completion of the works, the ground surface disturbed during the site preparation works and at the entry and exit pits will be carefully reinstated and re-seeded at the soonest opportunity to prevent soil erosion; ❯ The silt fencing upslope of the Grand Canal will be left in place and maintained until the disturbed ground has re-vegetated; ❯ There will be no batching of cement along the Proposed Grid Connection underground electrical cabling route; ❯ There will be no refuelling allowed within 100m of the Grand Canal crossing; and, ❯ All plant will be checked for purpose of use prior to mobilisation at the canal crossing. Fracture Blow-out (Frac-out) Prevention and Contingency Plan: ❯ The drilling fluid will be non-toxic and naturally biodegradable (i.e., Clear Bore Drilling Fluid or similar will be used); ❯ The area around the drilling fluid batching, pumping and recycling plants will be bunded using terram and/or sandbags to contain any potential spillage; ❯ One or more lines of silt fencing will be placed between the works area and the adjacent river; ❯ Spills of drilling fluid will be cleaned up immediately and transported off-site for disposal at a licensed facility; ❯ Adequately sized skips will be used where temporary storage of arisings are required; ❯ The drilling process / pressure will be constantly monitored to detect any possible leaks or breakouts into the surrounding geology or local watercourse; ❯ This will be gauged by observation and by monitoring the pumping rates and pressures. If any signs of breakout occur, then drilling will be immediately stopped; ❯ Any frac-out material will be contained and removed off-site; ❯ The drilling location will be reviewed, before re-commencing with a higher viscosity drilling fluid mix; and, ❯ If the risk of further frac-out is high, a new drilling alignment will be sought at the crossing location.		
MM94	Use Of Siltbuster	EIAR Chapter 9	Measures employed to prevent overdosing and potential chemical carryover:		

			› The Siltbuster system comprises an electronic in-line dosing system which provides an accurate means of adding reagents, and this minimises the risk of overdosing; › Continued monitoring and water analysis of pre and post treated water by means of an inhouse lab and dedicated, suitably qualified staff, means the correct amount of chemical is added by the dosing system; › Dosing rates of chemical to initiate settlement is small, being in the order of 2-10 mg/L and the vast majority of the chemical is removed in the deposited sediment; › Final effluent not meeting the discharge criteria will be recycled and retreated, which has a secondary positive effect of reducing carryover; and, › The use of biodegradable chemical agents will be implemented at very sensitive sites (i.e. adjacent to SACs). With the implementation of the dosing technology and the continual monitoring of pre and post treatment water, the appropriate volume of chemical agent can be added to ensure that chemical carryover concentrations are present only in tiny trace amounts which will not cause any effects to receiving waters or associated aquatic ecology.		
MM95	Hydrologically Connected Designated Sites	EIAR Chapter 9	Mitigation measures in relation to the protection of surface water drainage regimes and surface water quality within the Project Site detailed in the preceding sections as follows: › Mitigation measures for suspended solids are detailed in Line-Items MM85 and MM86 above. › Mitigation measures for the control of hydrocarbons during construction works are detailed in Line-Item MM87 above. › Mitigation measures for the control of cement-based products during construction works are detailed in Line-Item MM88 above. › Mitigation measures in relation to wastewater are detailed in Line-Item MM89 above.		
MM96	Groundwater Abstractions	EIAR Chapter 9	› Mitigation measures for the control of hydrocarbons during construction works are detailed in Line-Item MM87 above.		

	(Public and Private)		› Mitigation measures for the control of cement-based products during construction works are detailed in Line-Item MM88 above. › Mitigation measures in relation to wastewater are detailed in Line-Item MM89 above. › Mitigation measures in relation to piling works are detailed in Line-Item MM90 above		
MM97	Surface Water Drinking Supplies	EIAR Chapter 9	› Mitigation measures for sediment control are detailed in Line-Items MM85 and MM86 above. › Mitigation measures for the control of hydrocarbons during construction works are detailed in Line-Item MM87 above. › Mitigation measures for the control of cement-based products during construction works are detailed in Line-Item MM88 above.		
MM98	WFD Status and Objectives	EIAR Chapter 9 Appendix 9-4	› Mitigation measures for sediment control are detailed in Line-Items MM85 and MM86 above. › Mitigation measures for the control of hydrocarbons during construction works are detailed in Line-Item MM87 above. › Mitigation measures for the control of cement-based products during construction works are detailed in Line-Item MM88 above. › Mitigation measures in relation to wastewater are detailed in Line-Item MM89 above. › Mitigation measures in relation to piling works are detailed in Line-Item MM90 above.		
MM99	Biodiversity Management Plan	EIAR Chapter 9 Appendix 6-5	Slow-release fertilisers will be used to reduce nutrient losses through leaching and surface runoff by releasing nutrients gradually in line with vegetation requirements. There will be no application of fertilizers within the hydrological buffer zones.		
MM100	Amenity Track	EIAR Chapter 9	Detailed mitigation measures for sediment control are outlined in Line-Items MM85 and MM86 above and detailed mitigation measures for control of hydrocarbons during construction works are outlined in Line-Item MM87 above.		

MM101	Proposed Turbine Delivery Route Accommodation Works	EIAR Chapter 9, 15	**Mitigation by Avoidance:** A constraint/buffer zone will be maintained for all upgrade works locations where possible. In addition, measures will be implemented to ensure that silt laden or contaminated surface water runoff from the excavation work does not discharge directly to the watercourse. The purpose of the constraint zone is to: › Avoid physical damage to surface water channels; › Provide a buffer against hydraulic loading by additional surface water run-off; › Avoid the entry of suspended sediment and associated nutrients into surface waters from excavation and earthworks; › Provide a buffer against direct pollution of surface waters by pollutants such as hydrocarbons; and, › Provide a buffer against construction plant and materials entering any watercourse. General Best Practice Pollution Prevention Measures will also include: › No stockpiling of construction materials will take place within the constraints zone. No refuelling of machinery or overnight parking of machinery is permitted in this area; › No concrete truck chute cleaning is permitted in this area; › Works shall not take place at periods of high rainfall, and shall be scaled back or suspended if heavy rain is forecast; › Plant will travel slowly across bare ground at a maximum of 5km/hr. › Machinery deliveries shall be arranged using existing structures along the public road; › All machinery operations shall take place away from the stream and ditch banks, although no instream works are proposed or will occur; › Any excess construction material shall be immediately removed from the area and taken to a licensed waste facility or the on-site spoil management areas; › Spill kits shall be available in each item of plant required; and, › Silt fencing will be erected on ground sloping towards watercourses at the stream crossings if required.		

			Mitigation Measures relating to the use and storage of fuels and chemicals in terms of groundwater protection: › No maintenance of construction vehicles or plant will take place along the temporary junction works areas; › The plant used will be regularly inspected for leaks and fitness for purpose; and, › Spill kits will be available to deal with accidental spillage.		
MM102	Clear-Felled Forestry and Vegetation Removal	EIAR Chapter 9	<u>Mitigation by Avoidance</u> There is a requirement in the Forest Service Code of Practice and in the FSC Certification Standard for the installation of buffer zones adjacent to aquatic zones at planting stage. Minimum buffer zone widths recommended in the Forest Service (2000) guidance document "Forestry and Water Quality Guidelines" The setback distance from sensitive hydrological features means that adequate room is maintained for the proposed mitigation measures to be properly installed and operate effectively. The buffer/setback zone will: › Avoid physical damage (river/stream banks and river/stream beds) to watercourses and the associated release of sediment; › Avoid soil disturbance and compaction within close proximity to surface watercourses; › Avoid the entry of suspended sediment from works into watercourses; and, › Avoid the entry of suspended sediment from the drainage system into watercourses, achieved in part by ending drain discharge outside the buffer zone and allowing percolation across the vegetation of the buffer zone. In addition to the application of buffer/setback zones, the following supplementary mitigation measures will be employed during felling works: <u>Mitigation by Design</u>:		

			Mitigation measures which will reduce the risk of entrainment of suspended solids and nutrient release into surface watercourses comprise best practice methods which are set out as follows: › Machine combinations (i.e. handheld or mechanical) will be chosen which are most suitable for ground conditions and which will minimise soils disturbance; › All machinery will be operated by suitably qualified personnel; › Checking and maintenance of roads and culverts will be on-going through any felling operation. No tracking of vehicle through watercourses will occur, as vehicles will use road infrastructure and existing watercourse crossing points. Where possible, existing drains will not be disturbed during felling works; › Machines will traverse the Project Site along specified off-road routes (referred to as racks); › The location of racks will be chosen to avoid wet and potentially sensitive areas; › Brash mats will be placed on the racks to support the vehicles on soft ground, reducing mineral soil disturbance and erosion and avoiding the formation of rutted areas, in which surface water ponding can occur. Brash mat renewal will take place when mats 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 occurring, extraction will be suspended during periods of high rainfall; › Silt fences will be installed at the outfalls of existing drains downstream of felling areas. No direct discharge of such drains to watercourses will occur. Sediment traps and silt fences will be installed in advance of any felling works and will provide surface water settlement for runoff from work areas and will prevent sediment from entering downstream watercourses. Accumulated sediment will be carefully disposed of at pre-selected peat and spoil areas. Where possible, all new silt traps will be constructed on even ground and not on sloping ground; › In areas particularly sensitive to erosion it will be necessary to install double or triple sediment traps and increase buffer zone width. These measures will be reviewed on Site during construction; › Double silt fencing will also be put down slope of felling areas which are located in close proximity to streams and/or relevant watercourses; › 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;		

			› Timber will be stacked in dry areas, and outside watercourse buffer zones. Check dams and silt traps will be emplaced on the down gradient side of timber storage/processing sites; › Works will be carried out during periods of no, or low rainfall, in order to minimise entrainment of exposed sediment in surface water runoff; › Refuelling or maintenance of machinery will not occur within 50m of an aquatic zone or within 20m of any other hydrological feature. Mobile bowser, drip kits, qualified personnel will be used where refuelling is required; and, › 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. **Silt Traps**: Silt traps will be strategically placed down-gradient within forestry drains near streams. The main purpose of the silt traps and drain blocking is to slow water flow, increase residence time, and allow settling of silt in a controlled manner. **Timing of Proposed Project Felling Works:** Felling will only be carried out during periods of no or low rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses. **Drain Inspection and Maintenance**: The following items will be carried out 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; › Inspection of all areas reported as having unusual ground conditions;		

			› Inspection of main drainage ditches and outfalls. During pre-felling inspections the main drainage ditches will be identified. Ideally the pre-felling inspection will be carried out during rainfall; › Following tree felling all main drains will be inspected to ensure that they are functioning; › Extraction tracks within 10m of drains will 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, if impeded by silt or debris, will be unblocked; and, › All accumulated silt will be removed from drains and culverts, and silt traps, and this removed material will be deposited away from watercourses to ensure that it will not be carried back into the trap or stream during subsequent rainfall. **Surface Water Quality Monitoring**: Sampling will be completed before, during (if the operation is conducted over a protracted time) and after the felling activity. The 'before' sampling will be conducted within 4 weeks of the felling activity commencing, preferably in medium to high water flow conditions. The "during" sampling will be undertaken once a week or after rainfall events. The 'after' sampling will comprise as many samplings as necessary to demonstrate that water quality has returned to pre-activity status (i.e. where an impact has been shown). Criteria for the selection of water sampling points include the following: › Avoid man-made ditches and drains, or watercourses that do not have year-round flows, i.e. avoid ephemeral ditches, drains or watercourses; › Select sampling points upstream and downstream of the forestry activities; › It is advantageous if the upstream location is outside/above the forest in order to evaluate the impact of land-uses other than forestry; › Downstream locations will be selected: one immediately below the forestry activity, the second at exit from the forest, and the third some distance from the second (this allows demonstration of no impact through dilution effect or contamination by other land-uses where impact increases at third downstream location relative to second downstream location); and,		

			› The above sampling strategy will be undertaken for all on-site sub-catchments streams where tree felling is proposed. Also, daily surface water monitoring forms (for visual inspections and field chemistry measurements) will be utilised at every works site near a watercourse (to be completed by the EnvCoW). These will be kept on site for record and inspection.		
MM103	Mapped Wetlands	EIAR Chapter 9	› The mitigation measures proposed to protect surface water and groundwater during construction are detailed in Line-Items MM85 and MM86, and include measures for sediment control, and the prevention of hydrocarbon releases. › In addition, the Proposed Project layout has, where practicable, avoided the most sensitive ecological areas.		
Operational Phase					
MM104	Progressive Replacement of Natural Surfaces with Lower Permeability Surfaces	EIAR Chapter 4, 9 Appendix 4-4 Appendix 4-5	As the part of the Proposed Project drainage design, it is proposed that runoff from the proposed infrastructure will be collected locally in new proposed silt traps, settlement ponds and vegetated buffer areas prior to release into the existing drainage network. The proposed drainage measures will then create significant additional attenuation to what is already present. The operational phase drainage system will include the following: › Interceptor drains (for collecting and redistributing clean water) will be installed up-gradient of proposed infrastructure to intercept clean surface water runoff and minimise the volume of runoff entering construction areas where suspended sediment could become entrained. Intercepted clean water will be directed around the works and redistributed to downstream field drains. Where practicable, existing field drains will be utilised for this purpose; otherwise, new interceptor drains will be installed; › Collector drains will be installed downstream of works areas to collect runoff from access roads, Proposed Turbine hardstands and other construction areas where suspended sediment may become entrained. This runoff will be conveyed to local settlement ponds for treatment and settlement of suspended sediment prior to discharge to the nearest downstream field drain or main drain;		

			› On steeper sections of access road, transverse drains ('grips') will be installed, where appropriate, within the road surface to intercept runoff and divert it to adjacent roadside collector drains; › Check dams will be installed along sections of access road collector drains, where appropriate, to reduce flow velocities and promote the settlement of suspended sediment. Check dams will be constructed using 4/40 mm non-friable crushed rock and will be installed at 25 m or 50 m intervals, depending on the local gradient; › Settlement ponds, emplaced downstream of access road sections and at Proposed Turbine locations, will buffer volumes of runoff discharging from the existing drainage system during periods of high rainfall, by retaining water until the storm hydrograph has receded, thus reducing the hydraulic loading to existing downstream field/main drains; and, › Finally, all surface water runoff from the Proposed Project will have to pass through the existing IPC licence settlement ponds at the existing bog outfall locations prior to onward flow to surround streams and rivers.		
MM105	Suspended Solids Entrainment in Surface Waters	EIAR Chapter 9	› Mitigation measures for sediment control are the same as those outlined in Line-Items MM85 and MM86 above. › Mitigation measures for control of hydrocarbons during maintenance works are similar to those outlined in Line-Item MM87 above.		
MM106	Release of Wastewater	EIAR Chapter 9	It is proposed to install sealed underground holding tanks for effluent (wastewater) at the control buildings. The tanks shall be routinely emptied by a licensed contractor. A level sensor will be installed in the tanks which shall be linked to the on-site SCADA system. If the level of the tank contents rise to a predetermined 'high 'level a warning shall appear on the overall SCADA system for the site and automatic notification shall be sent to the facility manager. A formal service agreement will be entered into with a suitably permitted waste contractor, in relation to the servicing and de-sludging of the wastewater holding tank on-site. There will be no discharge of wastewater to ground at the Project Site, and therefore there is no potential to impact groundwater or surface water quality.		
MM107	WFD Status and Objectives	EIAR Chapter 9	› Mitigation measures for sediment control are detailed in Line-Items MM85 and MM86 › Mitigation measures for the control of cement-based products are detailed in Line-Item MM88		

		Appendix 9-4	› Mitigation measures for wastewater are detailed in Line-Item MM89		
MM108	Turbine Blade Erosion/ Leaching	EIAR Chapter 9	The Proposed Turbine blades will be subject to routine inspection and maintenance in accordance with the turbine manufacturer's requirements. Where blade repairs or coating maintenance are required, appropriate procedures will be implemented to prevent uncontrolled release of coating materials to the environment.		
Decommissioning Phase					
MM109	Decommissioning Phase	EIAR Chapter 9	The potential impacts associated with decommissioning of the Proposed Project will be similar to those associated with construction but of a reduced magnitude, due to the lesser scale of the proposed decommissioning works in comparison to construction phase works. Mitigation proposed in Line Items MM85 to MM108 will be implemented as appropriate.		
EIAR Chapter 10: Air Quality					
Construction Phase					
MM110	Exhaust Emissions	EIAR Chapter 10 Appendix 4-4	› All construction vehicles and plant used during construction will be maintained in good operational order while onsite. If any vehicle requires repair, this work will be carried out, thereby minimising any emissions that arise. › Turbines components and construction materials will be transported to the Project Site on specified routes only, unless otherwise agreed with the Planning Authority. › All machinery will be switched off when not in use. › Construction staff will be trained how to inspect and maintain construction vehicles and plant to ensure good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required. › The expected waste volumes generated onsite are unlikely to be large enough to warrant source segregation at the Project Site. Therefore, all waste 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 will be local to the Project Site to reduce the amount of exhaust emissions associated with vehicle movements. • Edenderry Recycling Centre is the closest waste facility to the Project Site and is approximately 3.5km north of the nearest Proposed Turbine (T32). • Drehid Landfill located approximately 6.5km northeast of the nearest Proposed Turbine (T30). • Chem Regen located approximately 25.5km southwest of the nearest Proposed Turbine (T14). • Cleary Compost & Shredding Ltd. located approximately 24.9km south of the nearest Proposed Turbine (T14). • Soltec (Ireland) Ltd, located approximately 31.5km northwest of the nearest Proposed Turbine (T32). • Allied Recycling located approximately 9.2km south of the Proposed Offsite Substation. › A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-4). The CEMP includes measures to reduce exhaust emissions. › Temporary Construction Compounds are spread out throughout the Project Site thus minimising the potential for traffic delays due to congestion building up at site entrance points and consequently further exhaust emissions.		
MM111	Dust Emissions	EIAR Chapter 10 Appendix 4-4	› A wheel wash facility will be installed at all proposed construction site entrances and will be used by vehicles before leaving the Project Site. › Dust suppression measures, including water spraying of exposed surfaces and trafficked areas, will be implemented as required during dry weather conditions. In periods of extended dry weather, dust suppression will be necessary along Proposed Construction Haul Routes, site roads, grid route, road widening sections, substation, and construction compounds to ensure dust does not cause a nuisance. › If necessary, such as during periods of dry weather, de-silted water will be taken from stilling ponds via the existing drainage system within the Allen Bog		

			Group, which encompasses part of the Proposed Project, and will be pumped into a bowser or water spreader to dampen down internal access roads, turbine bases and site compounds to prevent the generation of dust where required. › Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff as outlined in the CEMP. › Turbines components, construction materials and grid connection infrastructure will be transported to the Project Site via Proposed Construction Haul Routes, as agreed with the local authority. › The Proposed Construction Haul Routes adjacent to the Project Site will be regularly inspected for cleanliness and cleaned as deemed necessary by the construction Site Supervisor/Site Manager. › 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 dust emissions associated with vehicle movements. The nearest licensed waste facility located are: › Edenderry Recycling Centre is the closest waste facility to the Project Site and is approximately 3.5km north of the nearest Proposed Turbine (T32). › Drehid Landfill located approximately 6.5 km northeast of the nearest Proposed Turbine (T30). › Chem Regen located approximately 25.5 km southwest of the nearest Proposed Turbine (T14). › Cleary Compost & Shredding Ltd. located approximately 24.9 km south of the nearest Proposed Turbine (T14). › Soltec (Ireland) Ltd, located approximately 31.5 km northwest of the nearest Proposed Turbine (T32). › Allied Recycling located approximately 9.2km south of the Proposed Offsite Substation. › A CEMP will be in place throughout the construction phase. The CEMP includes dust suppression measures.		

			› Temporary Construction Compounds are spread out throughout the Project Site thus minimising the potential for traffic delays due to congestion building up at site entrance points and consequently further dust emissions. › All HGVs transporting construction materials to and from the Project Site will be covered with suitably secured tarpaulin sheeting to prevent dust emission during transit along Proposed Construction Haul Routes. › Vehicle speeds will be controlled when passing over access tracks and hardstanding areas within the Project Site, particularly during extended dry periods › If necessary, excavated material will be dampened prior to transport to the spoil management areas. › The Ecological Clerk of Works (ECoW) will perform daily visual site inspections of dust occurrence within the Project Site during construction, particularly during periods of dry weather and windy conditions. This will be noted as part of site environmental audits. The appointed construction manager for the contractor will be notified if dusty conditions are prevalent on site. › The ECoW will have power to halt construction works if required. › The construction contractor will be required to monitor monthly dust deposition levels each month for the duration of construction phase for comparison with the guideline of 350mg/m2/day (for non-hazardous dusts). This monitoring will be carried out at a series of suitable locations within the Project Site. Where dust levels are measured to be above this, mitigation measures will be reviewed		
Operational Phase					
MM112	Exhaust Emissions	EIAR Chapter 10	› Any vehicles or plant brought onsite during the operational phase will be maintained in good operational order that comply with the Road Traffic Acts 1961 as amended, thereby minimising any emissions that arise. › When stationary, delivery and on-site vehicles will be required to turn off engines. › Waste material will be transferred to a licensed /permitted 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 Project Site to reduce dust emissions associated with vehicle movements. The nearest licensed waste facility located are:		

			○ Edenderry Recycling Centre is the closest waste facility to the Project Site and is approximately 3.5km north of the nearest Proposed Turbine (T32). ○ Drehid Landfill located approximately 6.5 km northeast of the nearest Proposed Turbine (T30). ○ Chem Regen located approximately 25.5 km southwest of the nearest Proposed Turbine (T14). ○ Cleary Compost & Shredding Ltd. located approximately 24.9 km south of the nearest Proposed Turbine (T14). ○ Soltec (Ireland) Ltd, located approximately 31.5 km northwest of the nearest Proposed Turbine (T32). ○ Allied Recycling located approximately 9.2km south of the Proposed Offsite Substation. › Amenity carparks are spread out throughout the Proposed Wind Farm thus minimising the potential for traffic delays due to congestion building up at site entrance points and consequently further exhaust emissions.		
MM113	Dust Emissions	EIAR Chapter 10	› Any vehicles or plant brought onsite during the operational phase will be maintained in good operational order that comply with the Road Traffic Acts 1961 as amended, thereby minimising any dust emissions that arise		
Decommissioning Phase					
MM114	Decommissioning Phase	EIAR Chapter 10	Any impact and consequential effect that occurs during the decommissioning phase are similar to that which occur during the construction phase, albeit of lesser impact. The mitigation measures prescribed for the construction phase of the Proposed Project will be implemented during the decommissioning phase thereby minimising any potential impacts on air quality. The decommissioning of the Proposed Wind Farm will be completed in compliance with the requirements of the Draft Rehabilitation Plans for the Allen Bog Group as appropriate.		
EIAR Chapter 11: Climate					

Construction Phase					
MM115	Greenhouse Gas Emissions	EIAR Chapter 11	› Construction staff will be trained how to inspect and maintain construction vehicles and plant to ensure good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required. › All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise. › When stationary, delivery and on-site vehicles will be required to turn off engines. › Turbines and construction materials will be transported to the Project Site along the Proposed Construction Haul Routes and Proposed Turbine Delivery Route only unless otherwise agreed with the Planning Authority. Please see Section 15.1.10 of Chapter 15 Material Assets for details. › Aggregate materials for the construction of the internal access road network and all associated infrastructure will all be locally sourced where possible, which will further reduce potential emissions. › A CEMP (Appendix 4-4) will be in place throughout the construction phase. › The CEMP (Appendix 4-4) includes a Resource Waste Management Plan (RWMP) which outlines the best practice procedures that will occur during the construction phase relating to waste material. › The RWMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of construction of the Proposed Project. Disposal of waste will be seen as a last resort. › Section 4.6.9 of Chapter 4 for this EIAR refers to the methodology that will be utilised to manage onsite waste. This waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor. › The MRF facility will be local to the Project Site to reduce the number of emissions associated with vehicle movements. • Edenderry Recycling Centre is the closest waste facility to the Project Site and is approximately 3.5km north of the Proposed Turbine (T32).		

			• Drehid Landfill located approximately 6.5km northeast of the Proposed Turbine (T30). • Chem Regen located approximately 25.5km southwest of the Proposed Turbine (T14). • Cleary Compost & Shredding Ltd. located approximately 24.9km south of the Proposed Turbine (T14). • Soltec (Ireland) Ltd, located approximately 31.5km northwest of the Proposed Turbine (T32). • Allied Recycling located approximately 9.2 km southeast of the Proposed Offsite Substation. › Where applicable, low carbon intensive construction materials will be sourced and utilised onsite		
Operational Phase					
MM116	Greenhouse Gas Emissions	EIAR Chapter 11	Ensure that all maintenance and monitoring vehicles will be maintained in good operational order while onsite, and, when stationary, be required to turn off engines thereby minimising any emissions that arise.		
Decommissioning Phase					
MM117	Decommissioning Phase	EIAR Chapter 11	Any impact and consequential effect that occurs during the decommissioning phase are similar to that which occur during the construction phase, albeit of lesser impact. The mitigation measures prescribed for the construction phase of the Proposed Project will be implemented during the decommissioning phase thereby minimising any potential impacts. The decommissioning of the Proposed Wind Farm will be completed in compliance with the requirements of the Draft Rehabilitation Plans for the Allen Bog Group as appropriate.		
EIAR Chapter 12: Noise and Vibration					
Construction Phase					

MM118	Noise Control	EIAR Chapter 12 Appendix 4-4	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 assessment of potential impacts presented in Section 12.6.2 of Chapter 12 has demonstrated that the Proposed Project is expected to comply with the noise and vibration criteria during the construction phase and therefore no specific mitigation measures are required. 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 and BS 5228-2:2009+A1:2014. To ameliorate any potential noise impacts that may present during the construction phase, a schedule of noise control measures has been formulated in accordance with best practice guidance, and the contract documents will require the Contractor to implement these measures. These are outlined in the Construction and Environmental Management Plan (CEMP) that has been prepared for the Proposed Project included in Appendix 4-4.		
Operational Phase					
MM119	Operational Phase (Noise)	EIAR Chapter 12 Appendix 12-6	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. Mitigation will typically be applied at the turbine(s)) and may include engineering modifications to mechanical and/or electrical components; and/or software-based operational controls via the turbine control system (e.g., adjustments to operating mode, rotor speed and/or blade pitch). 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 Turbines.		
Decommissioning Phase					
MM120	Decommissioning Phase (Noise)	Chapter 12 Appendix 4-7	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 present during the decommissioning phase, a schedule of noise control measures has been formulated in accordance with best practice guidance. These are outlined in the Decommissioning Plan (Appendix 4-7) that has been prepared for the Proposed Project.		
EIAR Chapter 13: Landscape and Visual					
Construction Phase					
MM121	Visual Effects	EIAR Chapter 13	All construction activities will follow best practice methods to reduce impacts upon the environment and landscape of the Proposed Project. Further details are presented in the *Construction and Environmental Management Plan* (CEMP) contained in *Appendix 4-4* of this		

		Appendix 4-4	EIAR. The following mitigation measures and existing mitigating factors have been taken into account in determining the residual construction-phase visual effects: › General housekeeping measures, necessary for Health and Safety requirements, will ensure that the active construction areas will be kept tidy, further mitigating localised visual impacts during the construction phase. › Many residential receptors, as well as the roads themselves, are surrounded by treelines and hedgerows that will provide visual screening towards the proposed substations.		
MM122	Landscape Effects	EIAR Chapter 13 Appendix 4-4	All construction activities will follow best practice methods to reduce impacts upon the environment and landscape of the Proposed Project. Further details are presented in the *Construction and Environmental Management Plan* (CEMP) contained in *Appendix 4-4* of this EIAR. The following measures will 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. › 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.		
Operational Phase					
MM123	Landscape Effects	EIAR Chapter 13 Appendix 6-5	The following measures have been included in the Proposed Project design in order to avoid or reduce direct effects on landscape receptors (individual landscape features and the landscape character of the Project Site as a whole) on the Project Site: › The spatial configuration of the Proposed Project infrastructure footprint has been carefully designed to minimise the loss of valuable landscape receptors on the Project Site, such as remnants of uncut raised bog, mature woodland or features of cultural heritage value. › The internal site access road layout makes use of the existing roads wherever possible, to minimise the requirement for new tracks within the Project Site.		

			› To minimise cut and fill activities required to construct the Proposed Project, the proposed site access roads, and other infrastructure such as hardstands have been designed to align with the existing terrain within the landscape of the Project Site. › In all circumstances, excavation depths and volumes will be minimised, and excavated material will be re-used where possible. › Dedicated amenity and equestrian tracks are included in the Amenity Plan as part of the Proposed Wind Farm and will add recreational value to the landscape of the Proposed Wind Farm. › Proposed Enhancement Areas are included within the Proposed Wind Farm site to enhance, mitigate and offset existing habitats.		
Decommissioning Phase					
MM124	Decommissioning	EIAR Chapter 13	The landscape and visual effects during the Decommissioning Phase are anticipated to be of a similar nature as those occurring during the construction phase. The important element of decommissioning from a landscape and visual impacts perspective is the dismantling and removal of the wind turbines. This will occur for a limited period of time and will predominately involve cranes adjacent to the turbines during the dismantling process.		
EIAR Chapter 14: Cultural Heritage					
Pre-Construction/ Construction Phase					
MM125	Recorded Monuments (Direct Effects)	EIAR Chapter 14	› Archaeological monitoring of ground works associated with the proposed new amenity track extending from T46 interacts with the location of recorded monument KD012-002001- will be undertaken. Archaeological monitoring of any ground works proposed within the Proposed Enhancement Areas within Lodge Bog in the immediate vicinity of the recorded location of recorded monuments KD012-019— Platform – peatland and KD012-018— Structure – peatland and within a c. 20m radius of same. The monitoring will be carried out under licence from the National Monuments Service (NMS). A report on the monitoring will be compiled on completion of the work and submitted to the NMS and the Planning Authority/Body. Should archaeological finds, features or deposits be uncovered		

			during the monitoring further mitigation such as preservation in situ or preservation by record (excavation) may be required and will be carried out in consultation with the NMS. › Archaeological monitoring of ground works associated with the Proposed Grid Connection where it extends through the ZoN for KD013-017— Ringfort – rath will be undertaken. The monitoring will be carried out under licence from the National Monuments Service (NMS). A report on the monitoring will be compiled on completion of the work and submitted to the NMS and the Planning Authority/Body. Should archaeological finds, features or deposits be uncovered during the monitoring further mitigation such as preservation in situ or preservation by record (excavation) may be required and will be carried out in consultation with the NMS.		
MM126	Sub-Surface Archaeological Potential	EIAR Chapter 14	› Archaeological monitoring under licence from the NMS of any further 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. › Pre-development testing, under licence from the NMS, will be carried out in areas where peat depths allow a meaningful investigation. Testing will only be undertaken in areas where ground disturbance will take place as part of the Proposed Project. Where peat depths become a limitation to testing, monitoring at the construction stage will be undertaken. The areas to be tested will be chosen by the appointed archaeologist and the number of test trenches agreed between the archaeologist and the NMS through the licensing system. Peat depth data and local ground conditions may dictate the number and location of test trenches to be excavated. A report on the testing will be compiled on completion of the work. Should archaeological finds, structures or deposits be uncovered as a result of the testing further mitigation measures such as preservation in situ or preservation by record (excavation) may be required and will be decided in consultation with the NMS. Such mitigation measures will be implemented, where relevant, following consultation with the NMS. › Archaeological monitoring of ground works during the construction stage of the Proposed Project under licence from the NMS will be carried out by a suitably qualified archaeologist. Should archaeological finds, structures or deposits be uncovered as a result of the monitoring further mitigation measures such as preservation in situ or preservation by record (excavation) may be required and will be decided in consultation with the NMS.		

			Such mitigation measures will be implemented where relevant following consultation with the NMS. A report detailing the results of the monitoring and/or any further necessary mitigation as referred to above will be compiled on completion of the work and submitted to the NMS and Planning Authority/Body.		
EIAR Chapter 15: Material Assets					
Material Assets - Traffic					
Construction Phase					
MM127	Traffic Management of Large Deliveries	Chapter 15	The following are the main points to note for these deliveries which will take place after peak evening traffic: › The delivery of turbine components is a specialist transport operation with the transportation of components carried out at night when traffic is at its lightest and the impact minimised. › The deliveries will be made in consultation with the Local Authority and An Garda Síochána. › These nights will be spread out over an approximate period of 25 weeks and will be agreed in advance with the relevant authorities, › In order to manage each of the travelling convoys, for each there will be two Garda escort vehicles that will stop traffic when required at the front and rear of the convoy of 3 vehicles. › There will also be two escort vehicles provided by the haulage company for each convoy.		
MM128	Other Traffic Management Measures	EIAR Chapter 15 Appendix 15-2	A detailed **Traffic Management Plan (TMP)** (Appendix 15-2) will be provided specifying details relating to traffic management and included in the CEMP (Appendix 4-4) prior to the commencement of the construction phase of the Proposed Project. The TMP will be agreed with the local authority and An Garda Síochána prior to construction works commencing onsite. The detailed TMP will include the following:		

		Appendix 4-4	› **Traffic Management Coordinator** – a competent Traffic Management Co-ordinator will be appointed for the duration of the development, and this person will be the main point of contact for all matters relating to traffic management. Based on the scale of the Proposed Project it is envisaged that more than one person will be required for this role. › **Delivery Programme** – a programme of deliveries will be submitted to Kildare and Offaly County Councils in advance of deliveries of turbine components to the Proposed Wind Farm. Liaison with the relevant local authorities, TII and MMaRC will be carried out where required regarding requirements such as delivery timetabling. The programme will ensure that deliveries are scheduled in order to minimise the demand on the local network and minimise the pressure on the access to the Project Site. › **Information to locals** – Locals in the area will be informed of any upcoming traffic related matters e.g. the delivery of turbine components at night via letter drops and posters in public places. Information will include the contact details of the Project Co-ordinator, who will be the main point of contact for all queries from the public or local authority during normal working hours. An "out of hours" emergency number for the Traffic Management Co-Ordinator will also be provided. › **A Pre and Post Construction Condition Survey** – Where required by Kildare and Offaly County Councils Road Sections, a pre-condition survey of roads associated with the Proposed Project will be carried out immediately prior to construction commencement to record an accurate condition of the road network at the time. A post construction survey will be carried out after works are completed to ensure that any remediation works are carried out to a satisfactory standard. The timing of these surveys will be agreed with the local authorities. All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers. › **Liaison with the relevant local authority** - Liaison with Kildare and Offaly County Councils and An Garda Síochána, will be carried out during the delivery phase of the large turbine vehicles, when an escort for all convoys will be required. Once the surveys have been carried out and “prior to commencement” status of the relevant roads established, (in compliance with the provisions of the CEMP), the Road Sections of Kildare and Offaly County Council will be informed of the relevant names and contact numbers for the Project Developer/Contractor Site Manager as well as the Site Environmental Manager.		

			› Implementation of temporary alterations to road network at critical junctions – at locations highlighted in Section 15.1.6.1 in Chapter 15. › **Identification of delivery routes** – The optimal delivery routes for general construction traffic have been identified as part of the detailed link capacity assessment set out in Section 15.1.6.1 and are adopted for the traffic impact assessment presented in this EIAR. Prior to construction these routes will be agreed with Kildare and Offaly County Councils and adhered to by all contractors. › **Time restriction and locations** on routes - Construction traffic on the R402 through Edenderry will avoid the two peak hours between 08:00 – 09:00 and 17:00 – 18:00. Construction traffic on the R415 through Kilmeage will avoid the PM peak hour of 17:00 – 18:00. Grid construction on the R402 / R414 and L6002 should avoid school term time. › **Delivery times of large turbine components** – The large wind turbine plant components at night in order to minimise disruption to general traffic during the construction stage. › **Temporary traffic signs** – As part of the traffic management measures temporary traffic signs will be put in place at Access Junctions 5 on the R414 to facilitate the crossing of general construction traffic between Site Entrances I and J. All measures will be in accordance with the *"Traffic Signs Manual, Section 8 – Temporary Traffic Measures and Signs for Road Works"* (DoT now DoTT&S) and "Guidance for the Control and Management of Traffic at Roadworks" (DoTT&S). Construction staff (flagman) will be present at this location during peak delivery times. › Implementation of Stop & Go traffic management, and/or implementation of temporary diversion routes (Precautionary Option) during the construction of the Proposed Grid Connection underground electrical cabling route – As set out in Section 15.1.6.4.1 of this EIAR, in accordance with *"Traffic Signs Manual, Section 8 – Temporary Traffic Measures and Signs for Road Works"* (DoT now DoTT&S) and "Guidance for the Control and Management of Traffic at Roadworks" (DoTT&S). › Consultation with residents / business owners on Proposed Grid Connection underground electrical cabling route – To ensure access maybe retained at all times. › **Travel plan for construction workers –** While the assessment above has assumed the precautionary scenario in that construction workers will drive to the Project Site, the construction company will be required to provide a travel plan for construction staff, which will include the identification of routes to / from the Site and identification of area for parking on site.		

			› **Wheel washing / Road cleaning measures** – These additional measures will be put in place in order to minimise the effects of the development traffic on the surrounding road network. › **Re-instatement works** - All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers.		
Decommissioning Phase					
MM129	Decommissioning Phase	EIAR Chapter 15, 4 Appendix 4-7	In the event that the Proposed Project is decommissioned after the 35 years of operation, a decommissioning plan, will be prepared for agreement with the local authority, as described in Chapter 4 and Appendix 4-7 Decommissioning Plan. This plan will include preparation of a material recycling / disposal and traffic management plan for agreement with the local authority prior to decommissioning, in accordance with Scottish Natural Heritage report (SNH) *Research and Guidance on Restoration and Decommissioning of Onshore Wind Farms* (SNH, 2013).		
Material Assets - Other					
Pre-Construction/Construction Phase					
MM130	Electricity	EIAR Chapter 4, 5, 15 Appendix 4-4	› Goal posts will be established under the overhead line for the entirety of the construction phase. They will not exceed a height of 4.2 metres, unless specifically agreed with ESB Networks › Prior to construction, the Applicant will engage with ESB via the 'Dial Before You Dig' procedure online. ESB will be contacted via dig@esb.ie **before** excavating near any overhead lines. › The suitability of machinery and equipment for use near power lines will be risk assessed. › All staff will be trained on operating voltages of overhead electricity lines running the site. All staff will be trained to be aware of the risks associated with overhead lines. All contractors that may visit the sites will be made aware of the location of lines before they come on to site. › Barriers will run parallel to the overhead line at a minimum horizontal distance of 6 metres on plan from the nearest overhead line conductor wire.		

			› When activities must be carried out beneath overhead lines, e.g. component delivery or substation construction, a site-specific risk assessment will be undertaken prior to any works. The risk assessment will take into account the maximum potential height that can be reached by the plant or equipment that will be used prior to any works. Overhead line proximity detection equipment will be fitted to machinery when such works are required. › Information on safe clearances will be provided to all staff and visitors. › Signage indicating locations and health and safety measures regarding overhead lines will be erected in canteens and on site. › All staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021'. This will encompass the use of all necessary Personal Protective Equipment and adherence to the site Health and Safety Plan. › All health and safety measures as detailed in the Construction Environment Management Plan and Chapter 5: Population and Human Health of the EIAR will be adhered to during the construction, operation and decommissioning phases.		
MM131	Water	EIAR Chapter 9, 15	› Prior to construction, the Applicant will engage with Uisce Éireann in advance of finalising the detailed design in the vicinity of the identified watermain. The Applicant will identify the presence and likely alignment of the watermain through desk-based review of available Uisce Éireann network mapping, supplemented by site investigation. Where the watermain is confirmed to be located within or adjacent to the Proposed Grid Connection underground electrical cabling route, a 'Building Over or Near an Uisce Éireann Asset' application will be submitted to Uisce Éireann in advance of works. All proposed works along the Proposed Grid Connection underground electrical cabling route in the vicinity of the watermain will be undertaken in accordance with Uisce Éireann's Standard Details and Codes of Practice[7], and the Health and Safety Authority's *'Code of Practice for Avoiding Danger from Underground Services*[8].		

[7] https://www.water.ie/connections/developer-services/technical-guidance-connect
[8] https://www.hsa.ie/publications_and_forms/publications/construction/code_of_practice_for_avoiding_danger_from_underground_services_/

			› Section 9.5.2.16 and Section 9.5.2.17 of Chapter 9: Water assesses the potential for impact on public water supply and private wells during the construction phase. While no significant effects are identified, best practice mitigation measures have been prescribed to in Chapter 9 to minimise impacts on groundwater during the construction stage from the potential release of hydrocarbons, wastewater and cement-based products.		
MM132	Waterways	EIAR Chapter 15, 9, 12 Appendix 4-4	› Section 9.5.2.10 of Chapter 9: Water which identifies the mitigation measures identified to protect surface water quality at the HDD crossing of the Grand Canal. › Section 12.7.1 of Chapter 12: Noise and Vibration which identifies the noise and vibration construction phase mitigation measures.		
MM133	Waste Management	EIAR Chapter 15 Appendix 4-4	› All waste generated on site during the construction phase will be contained in waste skips located at each temporary construction compound within the Project Site. This waste storage area at each temporary construction compound 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 Project Site. Therefore, all waste streams generated on site will be deposited into a single waste skip. The waste material will be transferred to a Materials Recovery Facility (MRF) by a fully licenced waste contractor where the waste will be sorted into individual waste stream for recycling, recovery or disposal. › Site personnel will be instructed at induction that under no circumstances can personal waste be brought on site for disposal in the onsite waste skip. It will also be made clear that the burning of waste material on site is forbidden. › Further details on waste management are presented in Section 3.8 of the CEMP (Appendix 4-4)		
MM134	Gas	EIAR Chapter 15	› Prior to construction, the Applicant will engage with GNI via the 'Dial Before You Dig' procedure online. GNI will be contacted on 1800 42 77 47 before excavating near the identified medium-pressure pipeline. Furthermore, the 'Safety advice for working in the vicinity of natural gas pipelines' guidance document and the GNI 'Code of Practice'		

			standards will be adhered to during all proposed works along the Proposed Grid Connection in vicinity of the medium-pressure pipeline and the telecommunication lines.		
MM135	Telecommunications	EIAR Chapter 15 Appendix 15-8	To offset any potential impacts due to the Proposed Turbines on the Virgin Media radio network the Telecommunications Impact Assessment (TIA) (Appendix 15-8) identified three different mitigation options as detailed below: › Re-route the impacted radio links via an alternative Virgin Media Point of Presence (POP) site. › Relay the impacted radio links via a relay-mast located within the Proposed Wind Farm site. › Replace the impacted radio links with fibre broadband connections › The TIA provides an assessment of these mitigation solutions. Following detailed review the provision of a relay mast was deemed the preferred option and progressed for assessment. The location of the relay mast was carefully selected to consider topography, turbine density and existing wind farm developments. A figure outlining how the Virgin Media Links will be relayed can been seen within the TIA in Figure 26.		
Operational Phase					
MM136	Electricity	EIAR Chapter 15	The measures listed in MM130, which relate to the delivery of turbine components through the Project Site will be implemented in the unlikely event that a replacement of turbine components is required.		
MM137	Water	EIAR Chapter 9,15	Section 9.5.3 of Chapter 9 Water assess the potential for impact on public water supply and private wells during the operational phase. The chapter includes mitigation measures to minimise impacts on groundwater during the operational phase from the potential release of hydrocarbons, wastewater and cement-based products. These measures are detailed in Line Items MM87, MM88 to MM89 above.		
MM138	Waste Management Services	EIAR Chapter 15	› During the operational phase, the Other Material Assets Study Area will include appropriate signage and car park bins encouraging amenity users to leave the Proposed Wind Farm site waste free and bring waste materials home for proper disposal.		

			› Any waste generated due to the operational phase of the Proposed Project will be disposed of in a bin, located within the Proposed Onsite Substation compound. There will also be bins located at the proposed car parks for public use. The waste material will be transferred to a MRF by a fully licenced waste contractor where the waste will be sorted into individual waste stream for recycling, recovery or disposal. › The wastewater holding tank will be emptied when required by a licenced contractor.		
Decommissioning Phase					
MM139	Decommissioning	EIAR Chapter 15 Appendix 4-7	Any impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, albeit to a lesser extent		
EIAR Chapter 16: Aviation					
Construction Phase					
MM140	Restricted Airspace	EIAR Chapter 16	Any use of tall structures including cranes above 45m such are subject to notification to the IAA 30 days prior to erection. As per Table 4-28 in Chapter 4, it is proposed that Proposed Turbine erection will take 21 months to be completed. Flight within the airspace above the Aviation Study Area would be conducted via IFR or VFR, both require following the regulation applicable to IFR or VFR Flight.		
MM141	Low Flying Areas	EIAR Chapter 16 Appendix 16-2	The Edenderry/Allenwood/Rathangan LFTA cannot be mitigated directly (assuming that the activities do occur in the area of the construction phase activities, including the use of tall structures (i.e., cranes and Proposed Turbine erection) and therefore an alternative site will be required for this activity. The Applicant will engage with the DoD/Irish Air Corp to facilitate an alternative location for LFTAs if feasible. If an alternative area is confirmed there will be no impact on the Edenderry/Allenwood/Rathangan LFTA.		

			Appendix 16-2 *Impact to Proposed Wind Farm Planning, Ballydermot Wind Farm* outlines the possibility of moving areas such as Edenderry/Allenwood/Rathangan LFTAs. Further consultation with the Irish Air Corps could potentially identify suitable areas for a new low flying area to be established. Taking the current landcover and constraints of the Edenderry/Allenwood/Rathangan LFTA, it is considered the following elements are a requirement for a suitable LFTA: 1. *A relatively low population density for public safety and minimise noise emission impacts.* 2. *Predominately obstacle-free i.e., no masts, power lines, wind turbines.* 3. *No airfields (especially ones that cater for drone, model aircraft, micro light activities).* 4. *An area that is not conducive to the formation of local adverse weather such as fog, low cloud, or abnormal turbulence; and* 5. *Terrain that may be able to accommodate a forced landing with a reasonable possibility of a successful outcome i.e., no large expanse of heavily wooded or rocky terrain.*		
MM142	Aerodrome Safeguarding	EIAR Chapter 16	Any use of tall structures including cranes above 45m such are subject to notification to the IAA 30 days prior to erection. As per Table 4-28 in Chapter 4, it is proposed that Proposed Turbine erection will take 21 months to be completed. The Proposed Turbines are located at a in excess of 30km from both Casement and Dublin airports which mitigates the potential for significant effects. Flight within the airspace above the Aviation Study Area would be conducted under IFR or VFR, both of which require compliance with Rules of the Air.		
Operational Phase					
MM143	Restricted Airspace	EIAR Chapter 16	The IAA will be contacted to:		

		Appendix 16-2	1. *agree an aeronautical obstacle warning light scheme for the wind farm development* 2. *provide as constructed coordinates in WGS84 format together with ground and tip height elevations at each wind turbine location* The Proposed Turbines will be subject to an approved lighting scheme being established and final positions and heights will be forwarded to the IAA for publishing in the AIP. As outlined in Appendix 16-2 should the Irish Air Corps require the fitment of Infra-Red lighting compatible with the use of Night Vision Goggles NVG, there are many types available, and a list of compatible lighting should be obtainable from the Air Corps technical services command. It is not known whether the Air Corps use NVG systems operationally, or during training, but their popularity in military, medevac and search and rescue (SAR) missions would suggest there is a high probability of use. In addition to the above measures, pilots of both VFR and IFR flights are required by the National Regulator to make themselves familiar with their route, airspace they will be flying within, and current NOTAM and IAP information.		
MM144	Low Flying Areas	EIAR Chapter 16 Appendix 16-2	The Edenderry/Allenwood/Rathangan LFTA cannot be mitigated directly (assuming that the activities do occur in the area of the Proposed Turbines) and therefore an alternative site will be required for this activity. The Applicant continue to engage with the DoD/Irish Air Corp to facilitate an alternative location for LFTAs if feasible. If an alternative area is confirmed there will be no impact on the Edenderry/Allenwood/Rathangan LFTA. Appendix 16-2 *Impact to Proposed Wind Farm Planning, Ballydermot Wind Farm* outlines the possibility of moving areas such as Edenderry/Allenwood/Rathangan LFTAs. Further consultation with the Irish Air Corps could potentially identify suitable areas for a new low flying area to be established. Taking the current landcover and constraints of the Edenderry/Allenwood/Rathangan LFTA, it is considered the following elements are a requirement for a suitable LFTA:		

			1. *A relatively low population density for public safety and minimise noise emission impacts.* 2. *Predominately obstacle-free i.e., no masts, power lines, wind turbines.* 3. *No airfields (especially ones that cater for drone, model aircraft, micro light activities).* 4. *An area that is not conducive to the formation of local adverse weather such as fog, low cloud, or abnormal turbulence; and* 5. *Terrain that may be able to accommodate a forced landing with a reasonable possibility of a successful outcome i.e., no large expanse of heavily wooded or rocky terrain.*		
MM145	Primary Surveillance Radar	EIAR Chapter 16	The Applicant will notify the radar operators of the consented turbine locations and dimensions to allow for mitigation measures to be raised by the radar operators and implemented if required		
MM146	Secondary Surveillance Radar	EIAR Chapter 16	Should the project be consented, the Applicant will inform Dublin Airport, and any other relevant SSR radar locations, of the turbine locations and dimensions and they would decide if a Detailed Assessment was required in order to develop mitigation measures.		
MM147	Meteorological Radar	EIAR Chapter 16	The WMO's paper identifies this as an 'Intermittent Zone' and also recommends Notification to the Met Éireann station at Dublin Airport is required for proposed wind farm developments at distances greater 45km. The Applicant is committed to engaging with Dublin Airport/Met Éireann in relation to meteorological radar.		
MM148	Aerodrome Safeguarding	EIAR Chapter 16	The Proposed Turbines are located at a significant distance from both Casement and Dublin airports which mitigates the potential for significant effects. Flight within the airspace above the Aviation Study Area would be conducted under IFR or VFR, both of which require compliance with Rules of the Air.		
Decommissioning Phase					

MM149	Decommissioning	EIAR Chapter 16	› Upon decommissioning of the Proposed Wind Farm, the Proposed Onsite Substation and Proposed Offsite Substation will form part of the national grid infrastructure and operate in perpetuity as part of Transmission System and TAO assets and will remain in-situ. The assets transferred to the TAO will not form part of the decommissioning works. › Any impact and consequential effect that occurs during the decommissioning phase will be similar to that which occur during the construction phase, albeit of lesser impact. The mitigation measures prescribed for the construction phase of the Proposed Wind Farm will be implemented during the decommissioning phase thereby minimising any potential impacts. The potential for effects during the decommissioning phase of the Proposed Wind Farm has been fully assessed in this EIAR.		

19.2 EIAR Monitoring Measures

Table 19-2 Schedule of Monitoring Measures

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
Pre-Construction Phase						
MX1	Drainage Maintenance	EIAR Chapter 4, 9 Appendix 4-4	An inspection and maintenance plan for the drainage system onsite will be prepared in advance of commencement of any works on the Proposed Project. Regular inspections of all installed drainage features will be carried out, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water at parts of the systems where it is not intended. The inspection of the drainage system will be the responsibility of the ECoW. Please see Section 9.4.1 of Chapter 9 Water and Section 3.2 of the CEMP for further information.	On going	Monthly	ECoW
MX2	Invasive Species	EIAR Chapter 6 Appendix 4-4	A pre-commencement invasive species survey of the construction footprint will be undertaken by a qualified ecologist to determine if any invasive species have established on the site since the undertaking of the previous surveys. The treatment and control of invasive alien species if recorded will follow guidelines issued by the National Roads Authority – The Management of Invasive Alien Plant Species on National Roads – Technical Guidance (TII, 2020).	Once	As required	Project Ecologist
MX3	Birds	EIAR Chapter 7 Appendix 7-7	› It is proposed that construction works will commence outside the bird nesting season (1st of March to 31st of August inclusive) to avoid the most sensitive time of the year for most bird species with the potential to use the site and its environs. Works are defined as the clearing of woody vegetation, any building or engineering works. Pre-commencement surveys will be	Once	As required	Project Ornithologist

			undertaken within one month prior to the initiation of works. The purpose of these surveys is to identify sensitive roosting sites. › If works run into the subsequent breeding season(s) (April-September), surveys will be conducted to identify sensitive nesting sites. Breeding season surveys will be conducted once per month from April to July inclusive when works are taking place. If works run into the subsequent winter season(s) (October to March), surveys will be repeated to identify sensitive roost sites. These surveys will be conducted at the beginning of each winter season (e.g., October) and continue if evidence of roosting of birds of conservation concern is observed. › Surveys will be undertaken by a suitably qualified ornithologist. The survey will comprise a thorough walkover survey of the Proposed Project footprint and/or all works areas to a 500m radius, where access allows. If winter roosts or nests of birds of high conservation concern are identified, the roost/nest will be earmarked for continued monitoring during works. If the roost/nest is found to be active during works, works will cease within a species-specific buffer of its location in line with best practice guidance (Forestry Commission Scotland, 2006; Goodship and Furness 2022; Ruddock and Whitfield, 2007) to avoid disturbance. No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied. Aerial surveys using a drone may be used to confirm the presence or absence of roosting/nesting birds, where conditions are suitable. › All site staff and subcontractors will be made aware of any restrictions to be imposed by means of a toolbox talk and a map of the 'no-work zone' will be made available to all construction staff. The restricted area will also be marked to alert all personnel on site to the suspension of works within that area.			
Construction Phase						

MX4	Health and Safety	EIAR Chapter 4, 5 Appendix 4-5	The Project Supervisor Construction Stage (PSCS) appointed for the construction stage will be required to perform their duties as prescribed in the Safety, Health and Welfare at Work (Construction) Regulations. These duties include (but are not limited to): › Development of the Safety and Health Plan for the construction stage with updating where required as work progresses; › Compile and develop safety file information. › Reporting of accidents / incidents; › Weekly site meeting with PSCS; › Coordinate arrangements for checking the implementation of safe working procedures. Ensure that the following are being carried out: › Induction of all site staff including any new staff enlisted for the project from time to time; › Toolbox talks as necessary; › Maintenance of a file which lists personnel on site, their name, nationality, current SafePass number, current Construction Skills Certification Scheme (CSCS) card (where relevant) and induction date; › Report on site activities to include but not limited to information on accidents and incidents, disciplinary action taken and 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. › 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	Daily	Daily	PSCS

			› Weekly visits as required.			
MX5	Reactive Site Drainage Management	EIAR Chapter 4, 9	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 Ecological Clerk of Works (ECoW) on-site. The ECoW will respond to changing weather, ground or drainage conditions on the ground as the Proposed Project proceeds, to ensure the effectiveness of the drainage design is maintained in so far as is possible. This may require the installation of additional check dams; interceptor drains or swales as deemed necessary on-site. The drainage design may have to be modified on the ground as necessary, and the modifications will draw on the various features outlined above in whatever combinations are deemed to be most appropriate to situation on the ground as a particular time. In the event that works are giving rise to siltation of watercourses, the ECoW will stop all works in the immediate area around where the siltation is evident. The source of the siltation will be identified and additional drainage measures such as those outlined above will be installed in advance of works recommencing.	As required	As Necessary	ECoW
MX6	Water Quality and Monitoring	EIAR Chapter 9	Daily monitoring of excavations and the water treatment system by a suitably qualified person will occur during the construction phase. If high levels of seepage inflow occur, excavation work will immediately be stopped, and a geotechnical assessment will be undertaken. Daily inspection and recording of surface water management system by on-site EnvCoW and immediate remedial measures to be carried out as required and works temporarily ceased if a retained stormwater/sediment load is identified to have the potential to migrate from the site. The following periodic inspection regime will be implemented:	Daily	As Necessary	EnvCoW / Project Hydrologist

			❯ Daily general visual inspections of site operations and inspections of all drainage infrastructure within the site and in the surrounding area by the EnvCoW or a suitably qualified and competent person as delegated by the EnvCoW; ❯ Inspections to include all elements of drainage infrastructure to ensure the system is operating correctly and to identify and 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 EnvCoW 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, ○ >half monthly average rainfall in any 7 days. ❯ Monthly site inspections by the Project Hydrologist/ EnvCoW during construction phase; ❯ Quarterly site inspections by the Project Hydrologist/ EnvCoW after construction for a period of one year following the construction phase; and, ❯ A written record will be maintained or available on-site within the CEMP (Appendix 4-4) which will be maintained on-site during the construction phase. ❯ Daily inspection and recording of surface water management system by on-sit EnvCoW and immediate remedial measures to be carried out as required and works temporarily ceased if a retained stormwater/sediment load is identified to have the potential to migrate from the site.			

			› Complete ongoing inspection and monitoring of the development, particularly in areas of drainage control in support of the EnvCoW in monitoring the effectiveness of the drainage design as it is implemented on-site.			
MX7	Water Discharge	EIAR Chapter 4 Appendix 4-4 Appendix 4-5	› There will be no direct discharges to any natural watercourses, with all drainage waters being dispersed as overland flows using in-situ drainage and settlement ponds. All discharges from the proposed works areas will be made over vegetation filters at an appropriate distance from natural watercourses › Dewatering silt bags are also used where water is pumped temporarily from excavations (e.g., turbine bases). Water is pumped into the silt bags, and then arising discharge is filtered through the silt bag fabric and flows into local collector drains. › Collect potentially silt-laden runoff from works areas via downgradient collector drains and manage via series of avoidance, source, in-line treatment and discharge to ground via infiltration drains and infiltration areas.	As Required	As Necessary	EnvCoW / Project Hydrologist
MX8	Surface Water Quality	EIAR Chapter 9	› During the construction phase field testing (visual, supplemented with pH, electrical conductivity, temperature, dissolved oxygen and turbidity monitoring), sampling and laboratory analysis of a range of parameters[9] with relevant regulatory limits and EQSs will be undertaken for each primary watercourse, and specifically following heavy rainfall events (i.e. weekly, monthly and event-based). › The data will be processed and analysed, and works will cease if elevated turbidity concentrations are recorded. In this event, all	As Required	Monthly	EnvCoW

[9] *example suite: pH (field measured), Electrical Conductivity (field measured), temperature (field measured), Dissolved Oxygen (field measured), Turbidity (NTU) (sonde measured), Flow (m/s), Total Suspended Solids (mg/l), Ammonia, Nitrite (NO_2) (mg/l), Ortho-Phosphate (P) (mg/l), Nitrate (NO_3) (mg/l), Phosphorus (unfiltered) (mg/l), Chloride (mg/l), and BOD (mg/l).*

			upstream silt traps and drainage routes will be inspected to identify the cause of the elevated turbidity levels. Works will not recommence until any issues have been resolved and the turbidity concentrations have returned to background concentrations.			
MX9	Plant and Equipment Inspections	EIAR Chapter 9	The plant used will be regularly inspected for leaks and fitness for purpose.	As Required	Monthly	EnvCoW
MX10	Traffic and Transport	Appendix 4-5	› The Proposed Construction Haul Routes adjacent to the Project Site will be regularly inspected for cleanliness and cleaned as deemed necessary by the construction Site Supervisor/Site Manager.	As required	Monthly	EnvCoW
MX11	Biodiversity	Appendix 4-5	The Project Ecologist will be available to support the EnvCoW on matters relating to the protection of sensitive habitats and species encountered prior to or during the construction phase of the Proposed Project. The Project Ecologist will not be full time on site but will undertake pre-commencement surveys and visit the Project Site as required. The responsibilities and duties of the Project Ecologist/Ornithologist will include the following: › Undertake a pre-construction transect/walkover bird survey to ensure that significant effects on breeding birds will be avoided. › Inform and educate on-site personnel of the ornithological and ecological sensitivities within the site. › Oversee management of ornithological and ecological issues during the construction period and advise on ornithological and ecological issues as they arise. › Provide guidance to contractors to ensure legal compliance with respect to protected species onsite.	As required	As required	Project Ecologist

			› Liaise with officers of consenting authorities and other relevant bodies with regular updates in relation to construction progress.			
MX12	Birds	EIAR Chapter 7	A CEMP has been prepared (see Appendix 4-4) and will be in place prior to the start of the construction phase. Best practice measures which form part of the design of the project are included in Chapter 4 of the EIAR. Note that these measures are proposed as industry best practice rather than to mitigate any identified significant effect and will be updated as required to address any conditions of a permission or findings of any pre-construction survey results.	As Required	As required	Project Ornithologist
MX13	Peat and Spoil Management / Instability	Appendix 4-3 Appendix 8-1	To monitor possible peat movements, it is proposed to install sighting posts upslope and downslope of the access roads and turbine hardstands at staggered intervals at locations where the peat depth is greater than 2.5m. Additional monitoring locations will be required at infrastructure locations with deeper peat deposits, as determined by the Designer or Project Geotechnical Engineer. Details of sighting posts are given below. › A line of sighting posts will comprise: ○ A line of wooden stakes (typically 1 to 1.5m long) placed vertically into the peat to form a straight line. ○ The sighting line will comprise 6 no. posts at 5m centres that is a line some 25m long. ○ A string line will be attached to the first and last posts and all intervening posts will be adjusted so they are just touching the string line. › Lines of sighting posts will be placed across the existing slope about 5m away from the area to be worked. It is recommended that the posts are located along the road at 10m intervals in areas of deep peat (greater than 2.5m). Where there are relatively	As required	Every 6 Months	Geotechnical Engineer

			steeper slopes or softer ground a sighting line will be placed down the slope, or at any location where monitoring is deemed necessary by the Designer or the Project Geotechnical Engineer. › Each line of sighting posts will be uniquely referenced with each post in the line given a reference. The post reference will be marked on each post (e.g. reference 1-1, 1-2, 1-3, 1-4, 1-5, 1-6 for posts › in line 1). › The sighting lines will be monitored at the beginning of each working day, and during the day where considered appropriate (e.g. when working activity is concentrated at a specific location). › Monitoring of the posts will comprise sighting along the line and recording any relative movement of posts from the string line. › Where increased movements are recorded the frequency of monitoring will be increased. › A monitoring record will be kept of the date, time and relative movement of each post, if any. This record will be updated and stored as a spreadsheet.			
MX14	Archaeological Monitoring	EIAR Chapter 14	Archaeological monitoring of ground works during the construction stage of the Proposed Project under licence from the NMS will be carried out by a suitably qualified archaeologist. Should archaeological finds, structures or deposits be uncovered as a result of the monitoring further mitigation measures such as preservation in situ or preservation by record (excavation) may be required and will be decided in consultation with the NMS. Such mitigation measures will be implemented where relevant following consultation with the NMS. A report detailing the results of the monitoring and/or any further necessary mitigation as referred to above will be compiled on completion of the work and submitted to the NMS and Planning Authority/Body.	As Required	As Required	Project Archaeologist

MX15	Traffic Management	EIAR Chapter 15	It is proposed that speeds will be monitored by means of a one-off 7-day traffic count at Site Entrance B, C and E during the construction phase of the Proposed Project.	As Needed	As Needed	Traffic Consultant
Operational Phase						
MX16	Drainage Inspections	Appendix 4-6	The drainage system will be monitored in the operational phase until such a time that all areas that have been reinstated become re-vegetated and the natural drainage regime has been restored.	Monthly	Monthly	ECoW
MX17	Bats	EIAR Chapter 6 Appendix 6-2	**Post-Construction Bat Monitoring Plan** 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 *Favourable Conservation Status* 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:	Years 1, 2, 3	Annually	Project Ecologist

			› **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. Post-construction monitoring will be undertaken for a minimum of three years following commissioning of the Proposed Wind Farm. Where mortality remains below the defined threshold, the mitigation and curtailment regime in place at that time will be maintained. Additional post-construction monitoring may be undertaken at five-year intervals from Year 5 of operation onwards, subject to the outcomes of the initial monitoring programme and agreement with the relevant authorities. Where mortality exceeds the threshold, curtailment measures will be strengthened, and monitoring will be extended for a further two years. An annual monitoring report will be prepared and submitted to the Planning Authority and relevant statutory consultees (i.e. NPWS) by the owner or operator of the wind farm. The reports will include: › bat activity data and analysis, › observed fatalities and corrected mortality estimates,			

			❯ assessment of mitigation effectiveness, and recommendations for any required adjustments to the mitigation strategy.			
MX18	Biodiversity	EIAR Chapter 6 Appendix 6-5	Monitoring will be undertaken by a suitably qualified ecologist and will focus on the enhancement measures provided for marsh fritillary habitat, native hedgerow planting, native woodland enhancement and habitat creation for ornithology enhancement. Results will be documented within a Monitoring Report, which will identify any shortcomings, recommend corrective actions or amendments where required, and inform updates to management measures. Monitoring of habitat enhancement will be carried out annually until the proposed habitats have been sufficiently established and have given consistent results for 3 consecutive years after the establishment phase. During this time the Project Ecologist will ascertain whether the establishment methodology needs to be adapted. Once the habitats been successfully established, monitoring can be carried out every other year (years 5, 7, 10, 15 and 20 post-establishment) as deemed appropriate by the Project Ecologist. <u>Marsh Fritillary Enhancement Areas</u> ❯ Following establishment of devils bit scabious in Marsh Fritillary Enhancment Blocks A and B, marsh fritillary habitat condition assessments will be carried out in these areas as part of the Monitoring Plan. Habitat condition assessments include surveying along a predetermined route for the presence and abundance of devil's bit scabious as well as recording the vegetation height and any grazing evidence within the study site and is based on methodology and recording sheets designed by	As required Years 1, 3, 5, 7, 10, 15, and 20 years	As required Annually	Project Ecologist Project Ecologist

			the NBDC[10]. Monitoring will be carried out between August and September when devils bit scabious is in flower. The habitat condition assessments should be carried out in Years 1, 3, 5, 7, 10, 15 and 20 of the BMP (Appendix 6-5). The results of the marsh fritillary habitat condition assessments will inform whether adaptive management measures need to be introduced to improve the condition of the habitats for marsh fritillary. › Monitoring surveys will also include presence/absence surveys for marsh fritillary larvae initially in Blocks A and B throughout the Monitoring Plan. These will be carried out in accordance with best practice guidance (TII 2009) and the NBDC Marsh Fritillary survey methodologies for larval web surveys[11]. The optimum survey period for larval surveys is during August and September, in sunny conditions. Any occupied larval webs will be recorded. › Monitoring results will be reported by the appointed ecologist within a Monitoring Report. Any criteria failures will be identified, and corrective actions will be implemented. Reports detailing the monitoring works carried out, the results obtained and a review of their success, along with any suggestions for amendments to the Plan will be prepared. › The results of all monitoring will be made available to the NPWS. <u>Scrub Mosaic Areas</u> › The scrub mosaic creation areas proposed within 250m of the Proposed Turbines will be monitored for five years after these measures have been implemented (i.e. during the construction phase and the beginning of the operational phase), or until it can	Annually	As Necessary	Project Ecologist

[10] https://biodiversityireland.ie/app/uploads/2021/11/Marsh-Fritillary-Habitat-Condition-Form.pdf
[11] https://biodiversityireland.ie/app/uploads/2021/11/Marsh-Fritillary-Larval-Survey-Form.pdf

			be demonstrated that the proposed measures have satisfied the requirements to make these areas unsuitable for golden plover. › Vegetation surveys will be undertaken using a drone to map the vegetation within 250m of the Proposed Turbines where scrub mosaic measures are proposed (i.e. T2, T3, T4, T5, T6, T8, T9, T10, T11, T12, T13, T14, T15, T16, T17, T18, T22, T23, T24, T25, T26, T27, T28, T29, T30, T31, T32, T36, T38 and T39). The maps will be analysed to determine the extent of scrub coverage in these areas, if any open areas exceeding 10ha are identified within, or partially within, 250m of the Proposed Turbines, additional intervention will be required through planting of saplings or an additional application of fertilizer or agricultural lime as outlined in Section 4.10 of the BMP. **<u>Killina Bog Offsetting Area</u>** › The Killina Bog offsetting area will be monitored annually after the measures outlined within this BMP have been implemented (i.e. during the construction phase and during the lifetime of the Proposed Project). Vegetation surveys will be undertaken using a drone to map the vegetation. The maps will be analysed to determine the extent of scrub coverage and encroachment within the area, if scrub is identified within Killina Bog, additional intervention will be required through mechanical flailing as outlined in Section 4.10 of Chapter 4 of the EIAR. › The requirement for additional mowing in the offsetting areas will be informed by monitoring, i.e. if a second mowing is required during the winter season after the annual mowing in August. Vegetation mapping will be undertaken by drone within the offsetting area in early winter (October). Data will be recorded prior to the commencement of the BMP activities and annually thereafter. The results from the drone survey will be used to inform if a second mowing is required in the offsetting area. Thresholds are set in the methodology section above.	Annually	As Necessary	Project Ecologist

			These relevés will then be re-examined annually following the commencement of the BMP to establish the extent of habitat improvement resulting from management practices. **Peatland Enhancement Areas** › Prior to the commencement of the habitat enhancement measures described in this BMP, permanent vegetation monitoring plots will be established within the management areas. The monitoring plot locations will be selected using stratified random sampling. This will allow the monitoring plots to be representative of microtopography and vegetation cover, sampling areas from the wettest, intermediate and driest parts of the management areas. Biotic and abiotic parameters that form baseline indicators of ecological and hydrological condition of the bog will be recorded. Monitoring plots will be marked out permanently using fencing posts and their location recorded using GPS. The number of monitoring plots will be determined by the level of plant community heterogeneity identified following drain blocking, outflow blocking, berms and field reprofiling. However, it is proposed that a minimum of ten 4m x 4m monitoring plots will be established across each Block. The number of monitoring plots may change depending on the results of the initial surveys. › Monitoring plots will be surveyed once annually during the first five years of the windfarm and at 5 year intervals for the lifespan of the windfarm (35 years) by a suitably qualified ecologist. › Hydrological monitoring will also be undertaken by a competent hydrologist to assess the effectiveness of enhancement works. Water levels within areas where drains are blocked will be recorded bi-annually during the first five years of the Proposed Wind Farm and at 5-year intervals for the lifespan of the Proposed Wind Farm (35 years). A number of dip wells or piezometers will be inserted on the peatland to monitor the	Annually	As Necessary	Project Ecologist

			height of the water table. These will be constructed from 52mm internal diameter PVC. To stop peat filling the tube from the base, the pipe will be covered with gauze affixed with tape. This will be done prior to enhancement to allow monitoring of water levels within the enhancement areas. In this way, any positive impacts on the local hydrology can be verified and quantified. **<u>Enhancement of Pollinator Foraging Habitat Areas</u>** In order to monitor the success of the establishment of suitable foraging habitat for pollinators and to determine usage of these areas by pollinating insects three separate 1km transects will be walked. These will be undertaken on three occasions – once in June, July and August in Years 1, 3, 5, 7, 10, 15 and 20 in order to capture seasonal variability in pollinator communities. The transect routes will be designed to cover representative areas of habitats suitable for pollinator species – i.e. areas of species/flower rich grassland, open vegetated peatland and woodland edge habitat. During these transect walks all bees, butterflies/moths and hoverflies observed will be recorded. These taxa rely on pollen and nectar for their diets and are the most important and most effective pollinators of wild plants. Insects will be identified to species where possible. As it is preferred not to undertake lethal collection of specimens for later identification under a microscope, any species that cannot be identified reliably in the field will be assigned to either genus (if possible) or alternatively to its broad functional group, i.e. bee, butterfly or hoverfly. In addition to the transects, it is proposed that a minimum of ten 2m x 2m monitoring plots will be established across each Block in order to monitor the establishment of suitable habitat within the pollinator foraging habitat areas. **<u>Native Tree (Woodland and Scrub) Planting</u>**	Annually Annually	As Necessary As Necessary	Project Ecologist Project Ecologist

			Monitoring of newly planted native woodland will be undertaken to assess establishment success, structural development and species composition. Two 10mx10m long-term woodland monitoring plots will be established in each woodland block. Monitoring will include: › Survival rates of planted stock › Identification of failed planting requiring replacement › Assessment of early structural development › Confirmation that management measures are being implemented as intended › Any replacement planting or remedial management identified through monitoring will be implemented during the appropriate planting season and documented within the Monitoring Report. › Woodland planting will be inspected annually as outlined in Section 4.8.2. Monitoring frequency may be reduced where planting has successfully established, subject to the recommendations of the Project Ecologist. <u>Log and Brash Piles</u> In order to determine usage of the log and brash piles by invertebrates, small mammals, small birds, other fauna and fungi monitoring of the piles will take place in years 1, 3 and 5 after the conclusion of the construction phase of the Proposed Project, and every five years thereafter. The piles will be surveyed to determine species usage. <u>Pine Marten and Red Squirrel Boxes</u>	Years 1, 3 and 5 Annually	As Necessary As Necessary	Project Ecologist Project Ecologist

			There will be annual nest box monitoring at each of the 10 proposed boxes (5 pine marten and 5red squirrel) within the Project Site during the lifetime of the Proposed Project. Each box will be monitored for signs of occupancy. Should boxes be occupied (by any species, not limited to pine marten or red squirrel), then replacement boxes will be installed such that there will always be a surplus of 20% to allow for population growth and to avoid inter-specific competition for sites. **Embankments for Solitary Bees and Pollinators** In order to monitor the success of the establishment of suitable foraging habitat for pollinators and to determine usage of the embankments by solitary bees monitoring surveys will be undertaken on three occasions – once in June, July and August in Years 1, 3, 5, 7, 10, 15 and 20 in order to capture seasonal variability in pollinator communities. It is proposed that a minimum of ten 2m x 2m monitoring plots will be established across each Block in order to monitor the establishment of suitable habitat within the embankments.	Years 1, 3, 5, 7 10, 15 and 20	As Necessary	Project Ecologist
MX19	Birds	EIAR Chapter 7 Appendix 6-5 Appendix 7-7	**Lodge Bog Enhancement** The Lodge Bog Enhancement area will be the subject of ongoing monitoring during the operational phase of the Proposed Wind Farm to ensure it is offering supporting habitat for breeding waders, and wintering whooper swans and golden plover. The ongoing monitoring will take place during the breeding bird season (March to August) for breeding waders and winter (October to March) for whooper swan and golden plover. Each of the monitoring types are described in detail below. Breeding Wader Census Surveys Breeding wader census surveys will seek to identify whether these species are utilising the areas under active management. These	Monthly	As Necessary	Project Ornithologist

			surveys will be undertaken once a month March to August, each year. During the breeding season (March to August) three surveys will be undertaken for six hours per month starting at sunrise (as per Gilbert *et al.,* 1998), one overlooking each of the three proposed breeding wader areas. All activity of waders will be recorded and mapped. The peak number of birds for each species will be recorded as well as an estimate of the number of pairs of each species breeding within the breeding wader area. Breeding productivity and response to management will also be recorded. During each visit productivity data will be gather (e.g. how many pairs are displaying, how many pairs incubating, how many chicks within the area and how many birds fledged). Surveys will be undertaken from locations adjacent to the proposed breeding wader areas, at a sufficient distance as to not cause disturbance whilst surveying. <u>Winter Vantage Point Surveys</u> During the winter season (October to March), monthly vantage point surveys will be conducted during for six hours per month, alternating between starting one hour before sunrise to finishing one hour after sunset each month, at the two existing vantage point survey locations that are within Lodge Bog (i.e. VP5 and VP6), to monitor the usage of the enhancement area by golden plover and whooper swan. All golden plover and whooper swan activity will be recorded, including details of the number of birds landing within the Lodge Bog, the duration they were landed and if they were roosting or foraging. Each usage area will also be georeferenced.			

			Winter Roost Surveys Roost surveys will be undertaken at each of the two permeant waterbodies created for the benefit of whooper swans and the reedbed created for the benefit of roosting hen harrier. Surveys will be conducted once per month for the duration of the winter period (October to March) for three hours, alternating between one hour before sunrise to two hours after sunrise and between two hours before sunset to one hour after sunset each month for the whooper swan roost surveys. The hen harrier roost surveys will be conducted once per month for the duration of the winter period (October to March) for three hours, from two hours before sunset to one hour after sunset each month. All activity relating to whooper swan and hen harrier will be recorded, including the total number of birds using the roost area and the direction of flight of birds arriving at, or departing from, the roost area. Vegetation Surveys The Lodge Bog enhancement area will be monitored annually after the measures outlined within the BMP have been implemented (i.e. during the construction phase and throughout the lifetime of the Proposed Wind Farm). Sward height monitoring will be undertaken annually. Vegetation surveys will be undertaken using a drone, or other suitable remote sensing technology, to map the vegetation within Lodge Bog every five years. The maps will be analysed to determine the extent of scrub coverage and encroachment within the area, if scrub is identified within Lodge Bog, additional intervention will be required through mechanical flailing and/or livestock grazing as outlined in Appendix 6-5, Section 4.3.			

			The requirement for mowing in the breeding wader areas will be informed by the sward height monitoring. sward heights will be inspected within each of the breeding wader areas. Data will be recorded prior to the commencement of the BMP activities and annually in late winter thereafter. The character of each breeding wader area will be recorded, and photographs will be taken of each area from a fixed point. The results from the sward height inspections will be used to inform when mowing is required in the breeding wader areas. Thresholds are set in the methodology section of the BMP (Appendix 6-5). <u>Predator-Proof Fence Inspections</u> The predator-proof fence will be inspected annually prior to the commencement of the breeding season. The fence will be inspected for any damage that would reduce its effectiveness, such as holes, loose posts etc. Any repairs required to the fence will be undertaken before the start of the breeding season (1st March). Continuity on each strand of electrical fence will also be inspected around the entirety of the fence. Any maintenance required on the electrical wire will be undertaken before the start of the breeding season, e.g. any cutting of vegetation to ensure continuity of the electrical wires. Continuity of the electric fence will be inspected once per month during the breeding season (March to August). Any maintenance that is required to ensure the fence remains live is required, this will be completed as soon as possible after the required maintenance is identified. If a crow trapping regime is implemented, traps will be monitored daily while in use			

			Killina Bog Offsetting Area <u>Wintering Golden Plover Vantage Point Surveys</u> Vantage point surveys will seek to identify whether these species are utilising the areas under active management. These surveys will be undertaken once a month October to March inclusive, each year. During the winter season (October to March), monthly vantage point surveys will be conducted during daylight hours for six hours per month from one vantage point survey location, within Killina Bog, to monitor the usage of the enhancement area by golden plover. All golden plover activity will be recorded, including details of the number of birds landing within the offsetting area, the duration they were landed and if they were roosting or foraging. Each usage area will also be georeferenced. <u>Vegetation Surveys</u> The Killina Bog offsetting area will be monitored annually after the measures outlined within the BMP have been implemented (i.e. during the construction phase and throughout the lifetime of the Proposed Wind Farm). Sward height monitoring will be undertaken twice annually, in August and December each year. Vegetation surveys will be undertaken using a drone, or other suitable remote sensing technology, to map the vegetation within Lodge Bog every five years. The maps will be analysed to determine the extent of scrub coverage and encroachment within the area, if scrub is identified within Killina Bog, additional intervention will be required through mechanical flailing and/or livestock grazing as outlined in Appendix 6-5, Section 4.4.			

			The requirement for additional mowing in the offsetting areas will be informed by the sward height monitoring, i.e. if a second mowing is required during the winter season after the annual mowing in August. Vegetation mapping will be undertaken by drone within the offsetting area in early winter (October), every five years. Data will be recorded prior to the commencement of the BMP activities and every five years thereafter. The results from the drone survey will be used to inform if additional intervention is required in the offsetting area. Thresholds are set in the methodology section of the BMP (Appendix 6-5). The vegetation survey data will then be re-examined every five years following the commencement of the BMP to establish the extent of habitat improvement resulting from management practices. **Falcon Nest Boxes** There will be annual nest box monitoring at each of the 27 proposed nest boxes (2 peregrine and 25 kestrel) throughout the hinterlands of the Project Site during the lifetime of the Proposed Project. Each nest box will be monitored for signs of occupancy. Should nest box be occupied (by any bird species, not limited to peregrine or kestrel), then replacement nest boxes will be installed such that there will always be a surplus of 20% to allow for population growth and to avoid inter-specific competition for nest sites.			
MX20	Noise and Vibration	EIAR Chapter 12 Appendix 12-6	**Noise Compliance Monitoring Plan** 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 Project, the Applicant will submit a Noise Compliance Monitoring Protocol (NCMP) (see	Once within six months	As Required	Noise Consultant

			Section 12.3.6.11.2 of Chapter 12 of the EIAR) 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 Proposed Project. 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 and relevant corrective actions taken. For example, implementation of noise reduced operational modes resulting in curtailment of turbine operation can be implemented for specific turbines in specific wind conditions to ensure turbine noise levels are within the relevant noise criterion or conditions turbine noise limits. Such curtailment can be applied using the wind farm SCADA system with a marginal reduction of the wind turbine performance. After the implementation of the mitigation measures, the noise survey will be repeated to confirm compliance with the planning conditions. **Complaints Procedure** In the event of a complaint associated with noise, tonality or amplitude modulation from the proposed project, the operator will fully investigate the complaint in collaboration with the turbine			

			manufacturer (in accordance with the NCMP documents to be submitted and agreed with the local authority). A Draft Protocol for Managing Noise Complaints is presented in Appendix 12-6. A final version of this protocol will be contained within the NCMP to be agreed the relevant Local Authority and/or Authorities.			
MX21	Peat and Spoil Management / Instability	Appendix 4-3 Appendix 8-1	To monitor possible peat movements following the construction of the Proposed Wind Farm, it is recommended that the site is inspected by a suitably qualified engineer once every six months for the first three years following commissioning of the Proposed Wind Farm. Particular attention should be given to the peat deposition areas and the proposed borrow pits, as well to any areas where the site drainage is not functioning as intended. Should any signs of instability be noted, a site visit by a suitably qualified geotechnical engineer should be arranged and suitable remediation measures enacted and the site inspections should continue on an annual basis for a further three years.	As required	Every 6 Months	Geotechnical Engineer
Decommissioning Phase						
MX22	Decommissioning	Appendix 4-7	As noted in the Scottish Natural Heritage report (SNH) *Research and Guidance on Restoration and Decommissioning of Onshore Wind Farms* (SNH, 2013) reinstatement proposals for a wind farm are made approximately 30 years in advance, so within the lifespan of the wind farm, technological advances and preferred approaches to reinstatement are likely to change. According to the SNH guidance, it is therefore: *"best practice not to limit options too far in advance of actual decommissioning but to maintain informed flexibility until close to the end-of-life of the wind farm".*	End of Operational Life	As Required	Developer Appointed/ Contractor

			In this regard, the Decommissioning Plan (DP) (Appendix 4-7) will be reviewed and updated prior to commencement of decommissioning works to take account of the relevant conditions of the planning permission and current health and safety standards.			
MX23	Decommissioning	Appendix 4-7	The EnvCoW will maintain responsibility for monitoring the decommissioning works and Contractors/Sub-contractors from an environmental perspective. The EnvCoW will act as the regulatory interface on environmental matters. The Site Manager will be responsible for reporting to and liaising with Offaly County Council and Kildare County Council and other statutory bodies as required.	End of Operational Life	As Required	Site Manager/ EnvCoW
MX24	Decommissioning	Appendix 4-7	The Site Manager in consultation with the EnvCoW will be responsible for employing the services of a suitably qualified ecologist and any other suitably qualified professionals as required throughout the decommissioning works.	End of Operational Life	As Required	Site Manager/ EnvCoW
MX25	Decommissioning	Appendix 4-7	Prior to decommissioning, a suitably qualified ecologist will complete an invasive species survey of the site to identify invasive species where any minor excavation will be required. If present in these areas, the ecologist will propose suitable management measures.	End of Operational Life	As Required	Project Ecologist
MX26	Health and Safety	Appendix 4-7	› Report on site activities to include but not limited to information on accidents and incidents, disciplinary action taken and PPE compliance; › Monitor the compliance of contractors and others and take corrective action where necessary; and › Notify the Authority and the client of non-compliance with any written directions issued.	End of Operational Life	As Required	PSCS

MX27	Birds	Appendix 4-7 Appendix 7-7	› It is proposed that decommissioning works will commence outside the bird nesting season (1st of March to 31st of August inclusive) to avoid the most sensitive time of the year for most bird species with the potential to use the site and its environs. › Decommissioning surveys will be undertaken prior to the initiation of works at the Proposed Wind Farm site. The survey will aim to identify sensitive sites (e.g. nests or roosts). › Monitoring will be undertaken by a suitably qualified ornithologist. The survey will include a thorough walkover survey to a 500m radius of the development footprint and/or all works areas. If winter roosts or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located and earmarked for monitoring at the beginning of the first winter or breeding season of the construction phase. If the roost/nest is found to be active during the decommissioning phase no works shall be undertaken, works will cease within a species-specific buffer of this location (Forestry Commission Scotland, 2006; Goodship and Furness 2022; Ruddock and Whitfield, 2007) in line with best practice. No works shall be permitted within the buffer until it can be demonstrated that the roost or nest is no longer occupied. › All site staff and subcontractors will be made aware of any restrictions to be imposed by means of a toolbox talk and a map of the 'no-work zone' will be made available to all decommissioning staff. The restricted area will also be marked off using hazard-tape fencing to alert all personnel on site to the suspension of works within that area	End of Operational Life	As Required	Project Ornithologist