Chapter 16

Schedule of Commitments

SCOTTISHPOWER RENEWABLES

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Chapter 16
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16.1 Introduction

1. The Schedule of Commitments provides a summary of good practice, mitigation measures and commitments that have been proposed throughout the Environmental Impact Assessment (EIA) Report to prevent, reduce or offset the effects of the proposed Development on the environment.

2. Good practice and mitigation measures have been integral to the design evolution of the proposed Development as described in **Chapter 2: Site Description and Design evolution**. A series of environmental and technical constraint design reviews were undertaken to minimise potential significant environmental impacts prior to finalising the final design of the proposed Development. Areas which were examined in depth include landscape and visual constraints, sensitive habitats, cultural heritage and hydrological constraints.

16.2 Schedule of commitments

3. The mitigation measures and best practice commitments in **Table 16.1** are those which would be applied prior to construction, during construction and during operation of the proposed Development. A number of these measures are embedded mitigation, undertaken through good practice and to adhere to relevant legislation during all stages of the proposed Development.

4. Monitoring commitments, which would be applied prior to construction, during construction and during operation are detailed in **Table 16.2**.

16.3 Overall statement of significance

5. Provided that the proposed mitigation measures are successfully implemented, the residual effects related to most environmental disciplines would not be considered significant effects in the context of the EIA regulations, with the exception of landscape and visual effects.

6. All onshore windfarm development is likely to give rise to some significant landscape and visual effects. In the case of the proposed Development, the significant effects on landscape character and visual amenity would be contained within a relatively moderate area around the Site when compared with other wind farm developments of this scale. It is considered that the landscape is capable of accommodating the proposed Development, and that significant effects on the existing landscape character or visual amenity are relatively contained.

EIA Report chapter	Matter / effect requiring mitigation	Timing / phase	Mitigation measure
Chapter 3: Description of the proposed Development	Environmental management	Construction	The developer would engage an Environmental Clerk of Works (ECoW) onsite during the construction phase. The services of other specialist advisors will be retained as appropriate, such as an Archaeological Advisor, to be called on as required to advise on specific environmental issues. The Principal Contractor (PC) will ensure construction activities are carried out in accordance with the mitigation measures outlined in this EIA Report and any planning conditions, and this will be monitored by ScottishPower Renewables (SPR) and the ECoW. To ensure all mitigation measures outlined within this EIA Report are carried out onsite, contractors will be required to develop a Construction Environmental Management Plan (CEMP) which will form an overarching document for all site management requirements, including: • a Traffic Management Plan (TMP); • a Construction Methodology Statement (CMS) • a Pollution Prevention Plan (PPP) (including monitoring, as appropriate); • a Site Waste Management Plan (SWMP); and • a Water Management Plan (WMP). South Ayrshire Council, Dumfries and Galloway Council and other stakeholders, as required, would be consulted on these documents prior to commencement of construction, and performance against the CEMP would be monitored by SPR, the ECoW and PC throughout the construction period. An outline Construction Environmental Management Plan (CEMP) is provided as **Technical Appendix 3.1.** This sets out SPR requirements for inclusion within a detailed CEMP and other documents including guidance and best practice for adoption during construction of the proposed Development. The outline CEMP provides an overview of the following aspects of environmental management required to mitigate any potential environmental incidents during construction: • surface water management; • oil and chemical delivery and storage; • wastewater and water supply monitoring and control; • waste and resource management; • air, noise, vibration, land and flora and fauna; • emergency environmental spill response; • spill kits; • method statements and risk assessments; and • traffic and transport.
	Compensatory planting	Construction / Pre-operation / Operation	There would be a 60.1 ha net loss of stocked woodland area as a result of the proposed Development. In order to comply with the criteria of the Scottish Government's Control of Woodland Removal Policy, off-site compensation planting would be required. The Applicant is committed to providing appropriate compensatory planting. The extent, location and composition of such planting to be agreed with Scottish Forestry, taking into account any revision to the felling and restocking plans prior to the commencement of operation of the windfarm.
Chapter 7: Landscape and Visual	Lighting	Operation	It is proposed to explore the possibility of using 'smart' aviation lighting (aviation obstruction lighting detection system) whereby the lights would only be switched on when low altitude aircraft approach them. The CAA is in the process of consulting on a new policy statement on En-Route Aviation Detection Systems for Wind Turbine Obstruction Lighting Operation. SPR has had an opportunity to review the CAA's proposal as part of an industry working group considering this guidance. It is expected that this guidance will be finalised and released during 2019.
Chapter 8: Ecology	Protected species Otter and water vole, badger, squirrel, pine marten)	Pre-construction	To ensure all reasonable precautions are taken to avoid effects on protected species during the construction phase, it is recommended that a Species Protection Plan is adopted during the construction period. A Species Protection Plan would be produced which details measures to safeguard protected species known to be in the area. The Species Protection Plan would include pre-construction surveys and good practice measures during construction. Pre-construction surveys would be undertaken to check for any new protected species in the vicinity of the construction works.
	Bats	Pre-construction / Construction	Potential Bat Roosts - If it is proposed to place turbines within 200m of the three buildings (TNs 1 to 3) that have bat roost potential then further survey will be required to ascertain if a roost is present (following Collins, 2016). If a roost is present mitigation measures are likely to be required and any licencing requirements must be discussed with Scottish Natural Heritage. Buffers from Turbines – Following Natural England guidance (2014), it is recommended that a 50m buffer from turbine blade tip to habitat feature is adhered to in areas with edge habitat such as burns, lochs, or woodland edges, including forest rides. As medium risk species recorded a moderate BAI per hour, and activity was distributed throughout the study area, no descriptive buffer zones will be allocated and instead any edge habitat must be 50m away from the tip of a turbine blade. Furthermore, on-going research work at Stirling University is finding that bat activity increases in felled forest habitat (Lucinda Kirkpatrick, BCT Conference 2013, pers. comms.) as well as around key-holed turbines. In line with best practice guidelines (Natural England, 2014), the 50m buffer from turbine blade tip to the surrounding edge habitat must also be adhered to when felling and replanting, including habitat plans for turbine key holes.

		Operation	Curtailment of the operation of the wind turbines while they are idling i.e. below the cut-in wind speed at which electricity generation occurs. This mitigation measure will be implemented at each turbine between the months of April - October between sunset and sunrise each year for the lifetime of the proposed Development unless monitoring results necessitate a change.
	Pollution prevention	Pre-construction	Pollution prevention measures as part of a CEMP would be implemented. South Ayrshire Council (SAC), Dumfries and Galloway Council (D&GC), Scottish Natural Heritage (SNH) and Scottish Environment Protection Agency (SEPA) would be consulted on the plan in advance of construction. These measures would ensure the protection of the water environment and the fauna they contain.
	Wet modified bog	Construction	An ECoW would advise on micro-siting requirements to ensure impacts on bog are reduced further where possible.
	Protected species (Otter and water vole, badger, squirrel, pine marten)	Construction	Good practice measures would be implemented throughout construction in order to minimise the risks associated with a construction site on protected species known to be present (i.e. otter, badger and red squirrel), in line with relevant guidance. This would be delivered through a Species Protection Plan which would be included in the final Construction Method Statement. The Species Protection Plan details the procedures to be followed to ensure reasonable precautions are taken to avoid disturbance to protected species on the Site. For instance, such measures would include, amongst others, construction buffer zones around protected sites, the covering/securing all excavations and piping, storing all chemicals safely within bunded containers a minimum distance from all waterbodies, sensitive felling prescriptions, and so on as per the relevant guidance. The Species Protection Plan should also take into account good practice measures should a protected species previously unrecorded at the proposed Development be found to be present during construction. Vehicle speed limit on the proposed Development is 15 mph. This is in line with Health and Safety best practice during construction and also reduces the risk of collisions with protected species (e.g. badger).
Chapter 9: Ornithology	Birds	Pre-construction / Construction	Bird Protection Plan would be in place prior to the onset of construction activities. The BPP would describe survey methods for the identification of sites used by protected birds and will detail protocols for the prevention, or minimisation, of disturbance to birds as a result of activities associated with the proposed Development. The BPP would be overseen by the Ecological Clerk of Works. The BPP will include a description of surveys to locate the nests or other key sites (e.g. roosts) of birds listed in Schedules 1 and 1A of the Wildlife and Countryside Act, 1981, in advance of construction works progressing within the Site of the Project. In the event that an active nest or roost of a Schedule 1 or Schedule 1A species is discovered within distances given by Ruddock & Whitfield (2007) (or within a 500 m radius of the nest for Schedule 1 species not listed), a disturbance risk assessment will be prepared under the BPP and any measures considered necessary to safeguard the breeding attempt or roost (e.g., exclusion zones or restrictions on timing of works), would be submitted to SNH for agreement before recommencing work. If felling is required near to or including any nest locations this would be carried out during the non-breeding period. Should the nest of any other wild bird not listed on Schedule 1 be located, construction activities within 50 m of the nest site should be halted and the Ecological Clerk of Works (EcoW) informed immediately. A disturbance risk assessment should be undertaken and any measures considered necessary to prevent disturbance to the nest site be implemented. For some species breeding in some locations, no actions may be necessary but for others, buffers may be required around the nesting attempt to prevent unnecessary disturbance until the nest is no longer active.
Chapter 10: Hydrology, hydrogeology, geology and soils	Pollution risk, sediment management and management of surface runoff rates and volumes	Construction	Good practice measures would be applied in relation to pollution risk, sediment management, peat management and management of surface runoff rates and volumes. This would form part of the Construction Environment Management Plan (CEMP) to be implemented for the proposed Development and would be prepared prior to construction. The CEMP will outline the necessary surface water management, oil and chemical delivery and storage requirements, waste management, traffic and transport management and would specify monitoring requirements for waste water, water supply including an Environmental Incident Response Plan (EIRP) and all appropriate method statements and risk assessments for the construction of the proposed Development. As a principle, preventing the release of any pollution/sediment is preferable to dealing with the consequences of any release. There are several general measures which cover all effects assessed within this Chapter, details are given below. Prior to construction, section specific drainage plans would be produced. These would take into account any existing local drainage which may not be mapped and incorporate any section specific mitigation measures identified during the assessment. Measures would be included in the final CEMP for dealing with pollution/sedimentation/flood risk incidents and would be developed prior to construction. This would be adhered to should any incident occur, reducing the effect as far as practicable. The final CEMP would contain details on the location of spill kits, would identify 'hotspots' where pollution may be more likely to originate from, provide details to Site personnel on how to identify the source of any spill and state procedures to be adopted in the case of a spill event. As identified in the outline CEMP, a specialist spill response contractor would be identified to deal with any major environment incidents. A wet weather protocol would be developed. This would detail the procedures to be adopted by all staff during periods of heavy rainfall. Tool box talks would be given to engineering/construction/supervising personnel. Roles would be assigned to different engineering/construction/supervising personnel and the inspection and maintenance regimes of sediment and runoff control measures would be adopted during these periods. In extreme cases, the above protocol would dictate that work onsite may have to be temporarily suspended until weather/ground conditions allow.
	Pollution risk	Construction	Good practice measures in relation to pollution prevention would include the following: • refuelling would take place at least 50 m from watercourses and where possible it would not occur when there is risk that oil from a spill could directly enter the water environment. For example, periods of heavy rainfall or when standing water is present would be avoided;

			• foul water generated onsite would be managed in accordance with PPG4; • a vehicle management plan and speed limit (15 mph) would be strictly enforced onsite to minimise the potential for accidents to occur; • drip trays would be placed under stationary vehicles which could potentially leak fuel/oils; • areas would be designated for washout of vehicles which are a minimum distance of 50 m from a watercourse; • washout water would also be stored in the washout area before being treated and disposed of; • if any water is contaminated with silt or chemicals, runoff would not enter a watercourse directly or indirectly prior to treatment; • water would be prevented as far as possible, from entering excavations such as borrow pits; • procedures would be adhered to for storage of fuels and other potentially contaminative materials in line with the Water Environment (Oil Storage) (Scotland) Regulations 2006, to minimise the potential for accidental spillage (e.g. stored in 110% bunded storage facilities); and • a plan for dealing with spillage incidents would be designed prior to construction, and this would be adhered to should any incident occur, reducing the effect as far as practicable. This would be included in the final CEMP for the Development. As detailed within **Technical Appendix 10.3**, Site specific mitigation would be implemented to protect downgradient PWS sources: • although no upgrade to the existing access track form the A714 public road at the bridge of the River Cree is required, an audit of the drainage features that serve the track would be conducted to ensure the efficacy of SuDS features and that there is no direct discharge of track drainage to the water environment; • no refuelling/vehicle maintenance/parking zones would be implemented upgradient of the PWS at Arnimean (PWS02), Bankside (PWS04), Knockycoid Cottage (PWS07), Knockcoid Farm (PWS08) and Craigance (PWS09) and Laggish Farm (PWS10); • silt fences would be established along the minor crossing of the access track immediately upstream of the PWS abstraction of Bankside (PWS04) to prevent silt entering the watercourse directly; and • oil booms would be deployed on watercourses downgradient of watercourse crossings within the Cross Water catchment.
	Erosion and sedimentation	Construction	Good practice measures for the management or erosion and sedimentation would include the following: • all stockpiled materials would be located outwith a 50 m buffer from watercourses; • where possible, stockpiled material would either be seeded or appropriately covered; • water would be prevented as far as possible, from entering excavations such borrow pits through the use of appropriate cut-off drainage • where the above is not possible, water that enters the borrow pit would pass through a number of settlement lagoons and silt/sediment traps to remove silt prior to discharge into the surrounding drainage system. Detailed assessment of ground conditions would be required to identify locations where settlement lagoons would be feasible; • clean and dirty water onsite would be separated and dirty water would be filtered before entering the water environment; • if the material is stockpiled on a slope, silt fences would be located at the toe of the slope to reduce sediment transport; • the amount of ground exposed, and time period during which it is exposed, would be kept to a minimum and appropriate drainage would be in place to prevent surface water entering deep excavations, specifically borrow pit excavations; • a design of drainage systems and associated measures to minimise sedimentation into natural watercourses would be developed - this may include silt traps, check dams and/ or diffuse drainage; • silt/sediment traps, single size aggregate, geotextiles or straw bales would be used to filter any coarse material and prevent increased levels of sediment. Further to this, activities involving the movement or use of fine sediment would avoid periods of heavy rainfall where possible; and • SPR construction personnel and the Principal Contractor would carry out regular visual inspections of watercourses to check for suspended solids in watercourses downstream of work areas. Excavation of borrow pits, construction of hardstanding, diversion of drainage channels and construction of water crossings are the key sources of sediment generation. Adherence to good practice measures would ensure that any material generated is not transported into nearby watercourses. Location specific good practice measures would be in place for sediment control for each of the borrow pits to control the amount of fine sediment that could potentially enter a watercourse if not managed appropriately. These measures would be dependent upon the final borrow pit designs and stone quality, but would potentially include cut-off drainage, sediment traps, sediment lagoons and flocculation stations. Similar good practice measures to those applied at the borrow pit locations would be required around the track construction activities.
	Fluvial flood risk	Construction	It is proposed to adopt Sustainable Drainage Systems (SuDS) as part of the proposed Development. SuDS techniques aim to mimic pre-development runoff conditions and balance or throttle flows to the rate of runoff that might have been experienced at Site prior to development. Good practice in relation to the management of surface water runoff rates and volumes and potential for localised fluvial flood risk would include the following: • drainage systems would be designed to ensure that any sediment, pollutants or foreign materials which may cause blockages are removed before water is discharged into a watercourse; • onsite drainage would be subject to routine checks to ensure that there is no build-up of sediment or foreign materials which may reduce the efficiency of the original drainage design causing localised flooding; • appropriate drainage would attenuate runoff rates and reduce runoff volumes to ensure minimal effect upon flood risk; • where necessary, check dams would be used within cable trenches in order to prevent trenches developing into preferential flow pathways; and • as per good practice for pollution and sediment management, prior to construction, section specific drainage plans would be developed and construction personnel made familiar with the implementation of these. Further information on ground conditions and drainage designs would be provided in the final CEMP.

			Rainwater and limited groundwater ingress that collects in the turbine excavations during construction would be stored and attenuated prior to controlled discharge to ground adjacent to the excavation. Attenuation of runoff generated within the proposed turbine excavations would allow settlement of suspended solids within the runoff prior to discharge in accordance with 'Site control' component of the SuDS management train. Where possible, it is proposed to develop the borrow pits with a fall on the floor of the pits which falls away from the edge of the pit. This would ensure that all surface water runoff generated on the floor of the pit during construction would be contained within the pit prior to controlled disposal by pump or gravity (in a cut trench with granular fill) under supervision of the ECoW. If necessary a shallow open drain would be developed around the pit rim to prevent surface water inflow to the borrow pits. This drain would route the drainage around the pit and thus maintain the pre-development drainage paths. Water in the borrow pits would be managed in accordance with SuDS techniques. Attenuating runoff within the borrow pits would provide an opportunity for any suspended solids within the runoff to settle within the pit prior to controlled and pumped discharge from the pit.
	Water abstractions	Construction	Abstraction of water for construction activities is proposed from a suitable source yet to be identified. An application for a CAR Licence would be made to SEPA and managed through the regulation of the CAR Licence. Should a suitable source not be identified, a water bowser would be used. Good practice that would be followed in addition to the CAR Licence regulations includes: • water use would be planned so as to minimise abstraction volumes; • water would be re-used where possible; • abstraction volumes would be recorded; and • abstraction rates would be controlled to prevent significant water depletion in a source.
	Water course crossings	Construction	Two new and eight upgraded water crossings are required during the construction phase and would remain in place during the operational phase. The upgraded crossings would have the same design as the existing crossings and at least the same hydraulic conveyance capacity of the existing crossings. Good practice in relation to new water crossings involves the following aspects: • the appropriate crossing type would be identified from SEPA's best good practice guidance and would take into account any ecological and hydrological constraints; and • the crossing would be sized and designed so as to minimise effect upon flood risk (sized to accommodate at least the 200 year flow).
	Peat management	Construction / Pre-operation / Operation	**Peat Management Plan** <u>Crane hardstandings and temporary compounds:</u> In relation to crane hardstanding, guidance is to avoid their full reinstatement post-construction, given the likelihood of re-use for maintenance activities associated with the wind turbines (eg to replace a turbine blade). In relation to temporary compounds, the following good practice guidance applies: • peat stripped from compound and hard standing areas will require particularly careful storage due to its volume, and the relatively long residence times for stored peat; • stripped peat would be generally used for final restoration, however where vegetation regeneration requires reseeding; and • the choice of seed mix for reseeding should be appropriate to the ecological and hydrological conditions of the restored compound location and surrounding habitats. <u>Borrow Pits:</u> Peat may be re-used within borrow pits for the purpose of their restoration provided the method of reuse is consistent with the environmental reinstatement objectives of the Site and presents no residual risks from pollution of the environment or harm to human health (SEPA, 2012). Key issues for borrow pit restoration are: • prevention of desiccation and carbon losses from peat used in the restoration; • development of complete vegetation cover through emplacement of peat or seeding with an appropriate species. <u>Peat Excavation:</u> • if possible, excavated peat should be excavated as turves, including the acrotelm (surface vegetation) and a layer of adjoining catotelm (more humified peat) typically up to 500mm thick in total, or as blocks of catotelm; the acrotelm should ideally not be separated from its underlying peat; • the peat turves should be as large as possible to minimise desiccation during storage; • contamination of excavated peat with substrate materials should be avoided; and • consider timing of excavation activities to avoid very wet weather and multiple handling to minimise the likelihood of excavated peat losing structural integrity. If possible, extract intact full depth acrotelm layers from the top surface of the peat deposit. This technique will maintain connectivity between the surface vegetation and the partially decomposed upper layers of the catotelm. <u>Temporary storage:</u> The construction process will both generate peat and use peat. Where possible, "restore-as-you-go" techniques will be used to place excavated peat material in its final destination rather than in temporary stockpiles. However there may, in some circumstances, be a time-delay between these actions. During the interim period, peat would be stored onsite. It is important both for the peat itself and for the surrounding environment that the peat is not allowed to substantially erode or become dry, while it is stored. Procedures to control the hydrology of stored peat would be described in the Construction Environmental Management Plan (CEMP). The following good practice measures would be adopted and further detailed in the CEMP: • prior to the excavation of relevant infrastructure, vegetation, peat and superficial geology will be removed and stored in overburden stockpiles (or used directly in restoration of other areas; see below); • overburden stockpiles will be located adjacent to the infrastructure at least 50 m from watercourses in order to reduce the potential for sediment to be transferred into the wider hydrological system;

			• local gullies, diffuse drainage lines (or very wet ground) and locally steep slopes should be avoided for peat storage; • stockpiling of peat should be in large volumes to minimise exposure to wind and sun (and desiccation), but with due consideration for slope stability; • run-off from overburden stockpiles will be directed through the infrastructure SUDS measures (as described in the CEMP), including silt fences and mats, drainage measures and settlement lagoons, as appropriate; and • peat will not be allowed to dry out in the overburden stockpiles. Storage areas and dimensions will remain largely unknown until the Site work has commenced and the peat condition and requirements are better known. The location and details of temporary storage areas will be discussed and agreed with the Ecological Clerk of Works (ECoW) prior to stockpiling. <u>Transport:</u> • movement of turves should be kept to a minimum once excavated, and therefore it is preferable to transport peat planned for translocation and reinstatement to its destination at the time of excavation; and; • if HGVs/dump trucks that are used for transporting non-peat material are also to be used for peat materials, measures should be taken to minimise cross-contamination of peat soils with other materials. <u>Handling:</u> Following refinement of the windfarm peat model, a detailed storage and handling plan should be prepared as part of the CEMP, including: • best estimate excavation volume at each infrastructure location (including peat volumes); • volume to be stored locally and volume to be transferred directly on excavation to restoration areas elsewhere (e.g. disused quarries, borrow pits or forest drains) in order to minimise handling; • location and size of storage area relative to turbine foundation, crane hardstanding and natural peat morphology / drainage features; • irrigation requirements and methods to minimise desiccation of excavated peat during short term storage. These parameters are best determined post-consent in light of detailed ground investigation with the micro-siting areas for each element of infrastructure. <u>Restoration:</u> During restoration, the following best practice should be followed: • carefully evaluate potential restoration sites, such as borrow pits for their suitability, and agree that these sites are appropriate with the ECoW, landowners and relevant consultees; • undertake restoration and revegetation work as soon as practically possible; and • as far as reasonably practicable, restoration should be carried out concurrently with construction rather than at its conclusion. <u>Design and Geotechnical Risk Register:</u> A Design and Geotechnical Risk Register would be compiled to include risks relating to peat instability, as this would be beneficial to both SPR and the Contractor in identifying potential risks that may be involved during construction. A Peat Stability Pre-Construction Geotechnical Risk Register has been developed as part of the **Technical Appendix 10.1: PLHRA.** Good construction practice and methodologies to prevent peat instability within areas that contain peat deposits are identified in the PLHRA. These include: • measures to ensure a well-maintained drainage system, to include the identification and demarcation of zones of sensitive drainage or hydrology in areas of construction; • minimisation of 'undercutting' of peat slopes, but where this is necessary, a more detailed assessment of the area of concern would be required; • careful micro-siting of turbine bases, crane hardstandings and access track alignments to minimise effects on the prevailing surface and sub-surface hydrology; • raising peat stability awareness for construction staff by incorporating the issue into the Site Induction (e.g. peat instability indicators and good practice); • introducing a 'Peat Hazard Emergency Plan' to provide instructions for Site staff in the event of a peat slide or discovery of peat instability indicators; • developing methodologies to ensure that degradation and erosion of exposed peat deposits does not occur as the break-up of the peat top mat has significant implications for the morphology, and thus hydrology, of the peat (e.g. minimisation of off-track plant movements within areas of peat); • developing robust drainage systems that would require minimal maintenance; and • developing drainage systems that would not create areas of concentrated flow or cause over-, or under-saturation of peat habitats. Notwithstanding any of the above good construction practices and methodologies, detailed design and construction practices would need to take into account the particular ground conditions and the specific works at each location throughout the construction period. An experienced and qualified engineering geologist / geotechnical engineer would be appointed as a supervisor, to provide advice during the setting out, micro-siting and construction phases of the proposed Development.
	Peat landslide hazard	Construction	The following is a list of controls that should be considered for incorporation into the development of construction methodologies for the works in all areas of peat during detailed design stage: • appropriately experienced and qualified engineering geologist/geotechnical engineer is appointed during the construction phase, to provide advice during the setting out, micro-siting and construction phases of the works; • geotechnical Risk Register is developed and maintained by the appointed geotechnical engineer; • a minimisation of "undercutting" of peat slopes, but where this cannot be avoided, a more detailed assessment of the area of concern by the geotechnical engineer would be required; • careful micro-siting of turbine bases, crane hardstanding's and access track alignments to minimise effects on the prevailing hydrology; • although the risk of a peat slide is considered to be low for the majority of the proposed Development, it is recommended that methodologies should be developed as a contingency to minimise the effects to watercourses in the unlikely event of peat instability; and

			• use of floating track across areas of deep peat. <u>Good practice measures: General</u> • raise Health and Safety awareness of the peat environment at the proposed Development for construction staff by incorporating the issue into the Site Induction. Include peat slide risk assessment information (e.g. peat instability indicators, best practice and emergency procedures) in tool box talks with relevant operatives e.g. plant drivers; • introduce a 'Peat Hazard Emergency Plan' to provide instructions for Site staff in the event of a peat slide or discovery of peat instability indicators; • for sections of track that require track side cuttings into peat, suitable support measures would need to be designed to maintain the stability of the adjacent peat terrain; • refine/optimise the design through the pre-construction phase following completion of a detailed ground investigation; and • develop methodologies to ensure that accelerated degradation and erosion of exposed peat deposits does not occur as the break-up of the peat top mat has significant implications for the morphology, and thus hydrology, of the peat (e.g. minimise off-track plant movements within areas of peat). <u>Drainage measures:</u> Drainage design for the proposed Development is a critical mitigation measure in maintaining the hydrological conditions. In order to maintain hydrological conditions the following requirements of the drainage measures should be met: • development of drainage systems that would not create areas of concentrated flow or cause over, or under, saturation of peat habitats; • development of robust drainage systems that would require minimal maintenance; • a robust design of drainage systems and associated measures (i.e. silt traps, etc.) to minimise sedimentation into natural watercourses. Method statements should be prepared in advance to mitigate against a slide occurring and should include, but not be limited to, the use of check dams and erosion protection to limit flows and prevent contamination of watercourses; and • measures shall be put in place to ensure drainage systems are well maintained, to include the identification and demarcation of zones of sensitive drainage or hydrology in areas of construction, e.g. inclusion of maintenance regimes for drainage systems into a construction management plan or similar.
	Erosion and sedimentation	Operation	Immediately post-construction, newly excavated drains and track dressings may be prone to erosion as any vegetation would not have matured. Appropriate design of the drainage system, incorporating sediment traps, would reduce the potential for the increased delivery of sediment to natural watercourses. Potential effects from sedimentation or erosion during the operational phase are considered to come from linear features on steeper slopes, where velocities in drainage channels are higher. Immediately post-construction, flow attenuation measures would remain and be maintained to slow runoff velocities and prevent erosion until vegetation becomes established. Should any non-routine maintenance be required at the sections of track crossing wet areas (defined visually onsite by a contractor or operational personnel) there would be potential for erosion and sedimentation effects to occur due to the existence of disturbed material. Should this type of activity be required, then the good practice measures, as detailed for the construction phase, would be required on a case by case basis. Extensive work at water crossings/adjacent to the water environment may require approval from SEPA under the CAR (depending upon the nature of the activity).
	Fluvial flood risk	Operation	The risk of an effect on fluvial flood risk arises as a result of a potential restriction of flow at a permanent water crossing following intense rainfall. In accordance with good practice routine inspection of the culverts at site would be undertaken, reducing the likelihood of a blockage occurring. In the unlikely event of a blockage any flooding would be localised.
	Infrastructure and man-made drainage	Operation	Operation of the proposed Development requires limited activities relative to the construction phase. The presence of access tracks and hardstanding, as opposed to their construction, would affect the potential infiltration and groundwater conditions as well as the sub-surface flow paths around the infrastructure. In addition, cabling and crane hardstanding would also remain in situ to serve the proposed Development. Drainage may be required to service new sections of access track. This could also potentially alter groundwater levels and recharge. The dispersed nature of new drainage, coupled with good practice, means that the magnitude of the predicted effect of an alteration to drainage on groundwater levels and recharge of the groundwater body can be considered negligible.
	Maintenance	Operation	Should any maintenance be required onsite during the operational life of the project which would involve construction type activities; mitigation measures would be adhered to along with the measures in the CEMP to avoid potential effects.
Chapter 11: Archaeology and cultural heritage	Exclusion zones	Construction	The proposed Development has been designed to avoid direct impacts on the heritage assets within the Site. This design based mitigation would be secured by establishing clearly signed exclusion zones around those assets that could otherwise be accidentally damaged during construction works.
Chapter 12: Access, traffic and transport	Traffic Management Plan	Construction	Should the proposed Development receive consent, a Traffic Management Plan outlining the mitigation measures recommended during the construction stage would be put in place and agreed with the relevant authorities.
	Construction traffic	Construction	Abnormal Loads must be delivered to the Site under controlled conditions and under a suitable escort. The manner in which abnormal loads are transported along the public highway/ trunk road network would be subject to the approval of Transport Scotland, D&GC and Police Scotland in advance and would be planned to ensure road safety is not compromised. To reduce the potential effects of construction traffic, general good construction practice would be deployed, including the following:

			• a reputable construction Principal Contractor (PC) would be procured, with an Environmental Policy and good environmental track record. This would be established though assessment of environmental performance as part of the PC procurement exercise; • prior to the commencement of development, a detailed Traffic Management Plan would be agreed with Police Scotland, Ayrshire Roads Alliance, Dumfries and Galloway Council and Transport Scotland. This would include a number of measures to reduce the effects of the construction of the proposed Development on local receptors and communities, including the effects from turbine deliveries (abnormal loads). This would include details of any required temporary widening and other road improvement measures, together with detailed consideration of vehicle swept paths, loadings, structural assessments (where required), temporary street furniture removal details, dust and dirt management and community engagement. An element of preparation of the TMP would be a trial run, which would be undertaken through a special licence, with the Roads Authorities and Police Scotland in attendance. • a road condition survey (including assessment of existing structures as appropriate) prior to the construction period and a similar assessment following completion of the works; • accurate directions are given to delivery drivers to ensure that they are able to efficiently locate Site entrances to avoid impacting local residents, this may include the use of pre-prepared instructions/maps, grid references or other tools such as 'what3words'. • all HGVs delivering materials to the Site would be roadworthy, adequately maintained and sheeted as required; • adequate traffic management and banksmen would be deployed for the movement of HGVs and abnormal loads; and • HGV loads would be maximised to ensure that part load deliveries would be minimised.
	Traffic Control System	Construction / Operation	A Traffic Control system would be implemented that may include the following: • All onsite deliveries and collections will be co-ordinated through the Site Management Team and movements on to and off of Site would be tracked by the Site Security Team; • Drivers will be issued with and required to carry induction cards with a unique number to identify them that will be reviewed if any site protocols are breached; and • Where possible, no daytime or overnight parking of Site or construction vehicles (Site employees or visitors) outside of any predetermined construction compounds or work sites will be allowed.
Chapter 13: Noise	Construction noise	Construction	An outline CEMP is provided as **Technical Appendix 3.1** and the final CEMP would be secured through a planning condition. This would include measures to control construction noise including: • as proposed in **Chapter 3**, those activities that may give rise to audible noise at the surrounding properties and heavy goods vehicle deliveries to the Site would be limited to the hours 07:00 to 19:00 Monday to Friday and 07:00 to 16:00 on Saturdays and Sundays unless otherwise approved in advance by SAC (except in case of an emergency). Those activities that are unlikely to give rise to noise audible at the Site boundary, or light vehicle traffic accessing the Site such as that involved with staff mobilisation, may continue outside of the stated hours; • all construction activities shall adhere to good practice as set out in BS 5228; • all equipment would be maintained in good working order and any associated noise attenuation such as engine casing and exhaust silencers shall remain fitted at all times; • where flexibility exists, activities would be undertaken away from residential properties, set back by the maximum possible distances; • a site management regime would be developed to control the movement of vehicles to and from the Site; • construction plant capable of generating high noise and vibration levels would be operated in a manner to restrict the duration of the higher magnitude levels; • in particular, if noise-generating activities could occur outside of the stated working hours, this could potentially lead to increased effects of potentially minor significance, but it is considered unlikely that significant effects could arise due to construction due to the large distances involved for the proposed activities in the wide majority of cases.
	Blasting operations	Construction	If blasting is to be employed at some of the borrow pits located less than 2 km away from noise-sensitive locations, the potential noise and vibration effects of blasting operations would be reduced according to the guidance set out in the relevant British Standards and PAN50 Annex D: • blasting should take place under controlled conditions with the agreement of the relevant authorities, at regular times within the working week, that is, Mondays to Fridays, between the hours of 10:00 and 16:00. Blasting on Saturday mornings should be a matter for negotiation between the contractor and SAC; • vibration levels at the nearest sensitive properties are best controlled through onsite testing processes carried out in consultation with SAC. This Site testing based process would include the use of progressively increased minor charges to gauge ground conditions both in terms of propagation characteristics and the level of charge needed to release the requisite material. • blasting operations would need to adhere to good practice as set out in BS 5228-2, and in PAN50, Annex D, Paragraph 95 in order to control air overpressure; and • a scheme would be submitted to SAC and/or D&GC, for approval of blasting details, which would outline the mitigation measures to be adopted.
	Operational noise	Operation	Satisfactory control of cumulative noise immission levels would be achieved through enforcement of the individual consent limits for each of the individual windfarms.
Chapter 14: Land use and socio-economics	General adverse effects	Construction	The proposed Development, as described in **Chapter 3: Description of the proposed Development**, incorporates good practice measures for limiting the adverse effects of the construction works. The principal potential effects arising from construction tend to relate to construction traffic affecting use of the local highway network and onsite tracks and forestry roads for recreational users. Measures are set out in Chapter 3 and also in **Chapter 12: Access, Traffic and Transport** relating to how delivery of goods and services would be managed during construction so as to minimise impacts on sensitive receptors. The proposed management measures would be further developed in the CEMP that would be adopted prior to construction commencing. An outline CEMP is provided in **Technical Appendix 3.1.**
Chapter 15: Other issues	Aviation	Construction / Operation	As the proposed turbines would be in excess of 150m to blade tip, they would be required to be lit pursuant to Article 222 of the UK Air Navigation Order (ANO) 2016, with medium intensity (2000 candela) steady red aviation warning lights. It is acknowledged that the Site is in the Transition Zone to the Galloway Dark Sky Park so consideration is required to minimise lighting impacts. The Civil Aviation Authority (CAA) Policy Statement on Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150 m Above Ground Level

			(June 2017) modifies the strict application of Article 222 to allow the lights to operate in a lower intensity mode "if the horizontal meteorological visibility in all directions from every wind turbine generator in a group is more than 5 km". In these circumstances the 2000 candela lights could be operated at "not less than 10% of the minimum peak intensity specified for a light of this type" (200 candela). It is therefore proposed that visibility sensors be installed at the proposed Development and if visibility is restricted to 5 km or less the lights would operate at 2000 candela. The 2017 CAA Policy Statement further modifies Article 222 to permit only one level of intermediate lights, halfway up the tower, and at reduce intensity (32 candela rather than 2000 candela). At least three (to provide 360 degree coverage) low-intensity (32 candela) red lights should be provided at an intermediate level of half the nacelle height on the tower. In addition, it is proposed to explore the possibility of using 'smart' aviation lighting (aviation obstruction lighting detection system) whereby the lights would only be switched on when low altitude aircraft approach them. The CAA is in the process of consulting on a new policy statement on En-Route Aviation Detection Systems for Wind Turbine Obstruction Lighting Operation. SPR has had an opportunity to review the CAA's proposal as part of an industry working group considering this guidance. It is expected that this guidance will be finalised and released during 2019. The draft guidance would allow the aviation lights only to be illuminated when an aircraft is detected by a radar entering a volume bounded by 4 km (horizontal distance) from the perimeter group of turbines and 300m above the highest turbine tip of the Site. Our calculations estimate that the upper boundary of this volume would be around 2500 ft above ground level. The aviation lighting would not be activated when commercial airlines pass over the Site as such aircraft ordinarily operate in Controlled Airspace (CAS), the base of which CAS over the Site being 5,000 ft and above. Given the lights are only required for general aviators flying at night in the vicinity of the Site at altitudes of up to 2500 ft, it is anticipated that the lights will be rarely on in this quiet airspace. The widest transit across proposed Development t is circa 4 km (approx. north to south between turbine 4 and turbine 13), then the horizontal coverage volume would be 12km (4+4+4). At 250 knots the lights would be on for approximately 2 minutes, provided the radar can track the aircraft across the windfarm. If radar activated lighting is required, this would require a separate planning application, radar licencing and relevant CAA approvals. Optimally, any such radar deployment could benefit multiple windfarms in the South Ayrshire or Dumfries and Galloway regions. Periphery lights would also be lit with infra-red lighting to meet the MoD's low flying requirements (to be agreed with the MoD prior to turbine instalment).
	Public safety and access	Construction / Operation	Good practice measures would include: • site security and access during the construction period would be governed under Health and Safety at Work Act 1974 and associated legislation; and • during operation, appropriate warning signs would be installed concerning restricted areas such as the substation compound, transformers, switchgear and metering systems. All onsite electrical cables would be buried underground with relevant signage.

Table 16.1: Summary of mitigation and best practice commitments

<table>
<tr><th>Report Chapter</th><th>Matter / effect requiring monitoring</th><th>Timing / phase</th><th>Monitoring requirement</th></tr>
<tr><td>Chapter 3: Description of the proposed Development</td><td>Environmental Management</td><td>Construction</td><td>An Environmental Clerk of Works (ECoW) would be onsite during the construction phase to monitor the implementation of the following:
a Traffic Management Plan (TMP);
a Construction Methodology Statement (CMS)
a Pollution Prevention Plan (PPP) (including monitoring, as appropriate);
a Site Waste Management Plan (SWMP); and
a Water Management Plan (WMP).</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td rowspan="4">Chapter 8: Ecology</td><td>Avoid negative effects on habitats, protected species and aquatic interests</td><td>Pre-construction</td><td>To ensure all reasonable precautions are taken to avoid negative effects on habitats, protected species and aquatic interests, SPR would appoint a suitably qualified ECoW prior to the commencement of construction and they would advise SPR and the Principal Contractor on all ecological matters. The ECoW would be required to be present on the Site during the construction period and would carry out monitoring of works and briefings with regards to any ecological sensitivities on the Site to the relevant staff within the Principal Contractor and subcontractors.</td></tr>
<tr><td>Bats</td><td>Operation</td><td>Monitoring - Monitoring would comprise measurement of bat activity and fatality rates and would be undertaken annually until validation of the initial parameters and any amendments are established in consultation with SNH. The objective of the monitoring is to provide a robust estimate of the total number of bat fatalities, which will be used to determine whether the mitigation is effective.
The survey methodology will comprise static bat detectors at 6 randomly selected wind turbines during July – September inclusive which is when most fatalities are found to occur.
Microphones will be mounted 2 m height below the turbine nacelle and positioned horizontally facing away from turbine towers.
Carcass searching will be undertaken within a 50 m radius at the same 6 turbines every 2 weeks from 1st July until end of September i.e. 7 searches in total.</td></tr>
<tr><td>Pollution Prevention</td><td>Pre-construction</td><td>The pollution prevention measures would be implemented by SPR and the Principal Contractor and monitored by the ECoW during construction.</td></tr>
<tr><td>Fish</td><td>Construction / Pre-operation / Operation</td><td>A fish population monitoring programme before, during and after construction would be implemented.</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td>Chapter 10: Hydrology, hydrogeology, geology and soils</td><td>Water quality monitoring</td><td>Pre-construction / Construction</td><td>The catchments of the Water of Tig, Cross Water, Pollgowan Burn, Lavery Burn and River Cree have been highlighted as being at risk of potential construction effects due to the nature of works within the catchments as well as the high sensitivity receptors within the catchments. Water quality monitoring before and during the construction phase would be undertaken, to ensure that the tributaries of the main channels and sensitive receptors (PWS) identified at risk from the proposed Development have no significant impacts to water quality and/or quantity. Monitoring would be carried out at a specified frequency (depending upon the construction phase) on these catchments.
The following is an example water monitoring protocol that would be agreed with SAC:
<table>
<tr><th>Location</th><th>Frequency</th><th colspan="2">Determinand Suite</th></tr>
<tr><td>PWS02 (Arnimean)
PWS04 (Burnside)
PWS10 (Laggish Farm)
PWS14 (Barrhill Train Station and Ferngate Cottage)

Control Surface Water Catchment

Representative Water Samples for the following surface water catchments:
Cross Water
Duisk Water
River Cree
Water of Tig</td><td>Monthly</td><td><u>Field Sampling:</u>
Water Level (m bgl) (wells at PWS02 and PWS10 only)
pH
Redox
Conductivity
Dissolved Oxygen</td><td><u>Extractive Samples – parameters to be measured will be agreed with SAC and will include the following:</u>
Major anions and cations of water
Hydrocarbons
Suspended solids</td></tr>
</table>
* Monitoring locations, suite and frequency to be agreed with SAC
Surface water samples will be collected following guidance within SEPA, July 2003, Guidance on Monitoring of Landfill Leachate, Groundwater and Surface Water, v2 (specifically Section 9 thereof).</td></tr>
</table>

			Surface water samples should be collected using an extendable rod (up to 3 m) attached to a beaker (decontaminated between sampling locations) to ensure that the sampler is at a safe distance from the watercourse particularly during high flow conditions and potentially unstable embankments. Private water supply water samples will be collected in a similar manner to avoid cross-contamination between sample locations. Samples will be collected from dedicated sample taps or obtained using a clean disposable bailer. Prevailing weather conditions, qualitative flow conditions as well as other visual indicators will be recorded in order to aid the sample reporting. The water samples will be placed directly into appropriate sterile bottles, which are labelled and dispatched to a UKAS accredited laboratory, under chilled conditions and accompanied by the relevant chain of custody documentation. In the unlikely event that the routine monitoring data recorded potential pollution at a private water supply an investigation and intervention strategy would be agreed with SAC. Again, the details of which will be agreed prior to any construction and be secured by an appropriately worded planning condition. In the event that monitoring data collected at any private water supply is above the baseline monitoring record and above prescribed regulatory standards then property owners will be advised and repeat water sampling will be undertaken (if agreed with the property owners). Property owners will be advised within 24 hours of receipt of monitoring results. Repeat water sampling will be undertaken as soon as reasonably practicable and within 72 hours. Details of any affected property will be reported to SAC within 24 hours. ScottishPower Renewables commits to maintaining the yield and wholesomeness of water supplies. The following measures may be deployed in the unlikely event a private water supply is impaired by the works: • provision of bottled potable water in the event of a short or transient derogation of a water supply (bottled water will be retained on site ready for quick dispatch to any effected property); and • provision of an alternative water source (e.g. spring, borehole, alternative surface water abstraction location) in the event of a permanent derogation of a water supply. In the event of an alternative water source being implemented SAC will be advised as soon as is practical.
Chapter 11: Archaeology and cultural heritage	Archaeological monitoring	Construction	A programme of archaeological monitoring is proposed during the construction period. The programme would involve a watching brief during the excavation or ground breaking works that have the potential to have a direct impact on unrecorded buried archaeology and would be conducted by a professional archaeological organisation. The precise scope of any mitigation works would be developed in consultation with WoSAS on behalf of SAC and the agreed mitigation programme would be documented in an agreed Written Scheme of Investigation.
Chapter 13: Noise	Blasting operations	Construction	Where blasting may be employed at some of the borrow pits located less than 2 km away from noise-sensitive locations, the use of onsite monitoring at neighbouring sensitive locations during the course of preliminary testing could be used to define upper final charge values that would ensure vibration levels remain within the criteria as described in BS 5228-2 and BS 6472-2.
	Operational noise	Operation	The selection of the final turbine to be installed at the Site would be made on the basis of enabling the derived noise limits, as set out in Tables 5 and 6 of Technical Appendix 13.1, to be achieved at surrounding properties, including any relevant tonality corrections. The noise limits for all monitoring locations are consistent with the relevant condition in the consent for the Arecleoch Windfarm but are based on updated baseline noise levels which take into account relevant wind shear effects in line with current best practice.
	Noise complaints	Operation	It is proposed that if planning consent is granted for the proposed Development, conditions attached to the planning consent should include the requirement that, in the event of a noise complaint, noise levels resulting from the operation of the proposed Development, in combination with that of the Arecleoch Windfarm, are measured in order to demonstrate compliance with noise limits, as is the case for the Arecleoch Windfarm. Such monitoring should be done in full accordance with ETSU-R-97 and include penalties for tonal characteristics of the noise (if present).

Table 16.2: Summary of monitoring commitments

ScottishPower Renewables
320 St Vincent Street
Glasgow
G2 5AD

T +00 141 614 0451

arecleochwindfarmext@scottishpower.com

SCOTTISHPOWER
RENEWABLES