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PEEL WIND FARM (YELL) LTD

Beaw Field Wind Farm

Outline Construction Environment Management Plan

March 2016

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Wardell Armstrong LLP
City Quadrant, 11 Waterloo Square, Newcastle upon Tyne, NE1 4DP, United Kingdom
Telephone: +44 (0)191 232 0943 Facsimile: +44 (0)191 261 1572 www.wardell-armstrong.com

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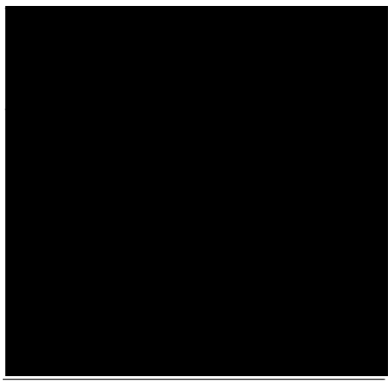
PREPARED BY:

Ishita Shah Senior Energy Consultant

APPROVED BY:

David Brignall Regional Director



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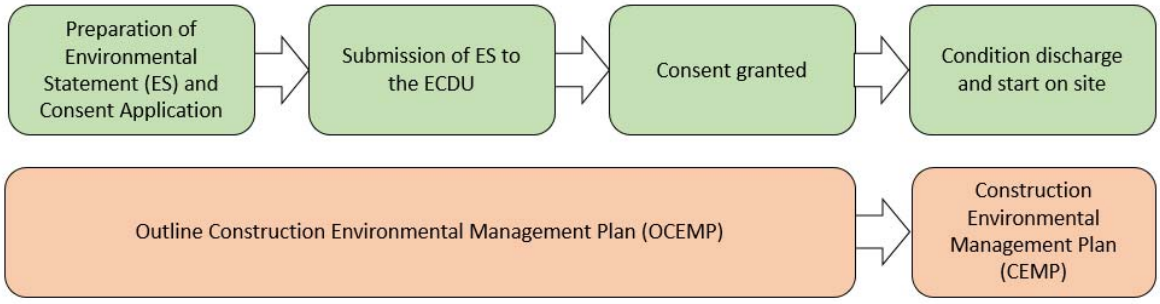
1 INTRODUCTION

1.1 Background

1.1.1 This document is an Outline Construction Environmental Management Plan (OCEMP) for the proposed Beaw Field Wind Farm (hereafter referred to as the "Proposed Development"). Peel Wind Farms (Yell) Ltd (the Applicant) is seeking consent from the Energy Consents and Deployment Unit (ECDU) to develop a wind farm comprising seventeen turbines and associated infrastructure on the southern edge of Yell, the largest of the Shetlands North Islands.

1.1.2 Wardell Armstrong has been commissioned by the Applicant to prepare an OCEMP as part of the Application for the Proposed Development.



1.2 Aims and objectives

1.2.1 The OCEMP provides a draft framework from which a detailed site specific Construction Environmental Management Plan (CEMP) will be produced following consent being issued for the Proposed Development. The detailed CEMP will ensure that environmental mitigation measures outlined within the consent are fully incorporated into the construction phase of the Proposed Development.

1.2.2 It must be remembered that this document is presented in outline only and that the construction methods, operational processes and detailed site specific conditions will have an effect upon a number of aspects of the wind farms development. Consequently these details will require further investigation once consent is granted. Much of this investigatory work will be required as part of the discharge of conditions attached to the planning consent. Once the required site investigations have been completed and a detailed construction methodology has been finalised, a detailed CEMP will be produced. Following this, the CEMP will be subject to approval by

Shetland Islands Council (SIC) which will consult with SEPA and SNH to ensure that their views are taken into account prior to approving the document.

1.2.3 The CEMP will remain as an active document throughout the construction period and will be subject to review and update where necessary to ensure that the construction operations of the Proposed Development meet relevant emerging good industry practice standards as well as reflecting any changing conditions found on site.

1.2.4 The Applicant will be responsible for updating the content of the future CEMP and along with all contractors and subcontractors, will adhere to the CEMP in its final approved form.

1.3 Structure of this OCEMP

1.3.1 The following section first describes the Proposed Development and outlines the likely pre-construction surveys required. Following this the general site operations, environmental site management practices, outline construction activities and restoration and aftercare measures are addressed.

1.3.2 Various figures from the Proposed Development ES are referred to throughout this document, these figures are not repeated within this OCEMP. A sensitive receptors plan is attached (Figure A3.6.1) to this OCEMP and shows the location of nearby residential properties and other environmental constraints that must be considered during the construction phase of the Proposed Development.

1.3.3 The final detailed CEMP should be read in conjunction with a number of other reports and management plans which form part of the Application for the Proposed Development or will be produced once the consent has been granted, these are outlined below.

1.3.4 The final CEMP must ensure that it is consistent with the aims and objectives of the documents shown in the figure below.

1.3.5 The contents of this OCEMP have been prepared to take account of "Good Practice During Wind Farm Construction[i]" and "Guidelines for Onshore and Offshore Wind Farms" and has been developed to identify all the environmental management, mitigation and monitoring requirements during construction phase identified within the Environmental Statement.

1.3.6 In addition to the Proposed Development described on the following pages, certain other works that form part of the "development as a whole" are not considered in this

CEMP. These include connection to the national electricity grid which will be secured by the District Network Operator (DNO) via its permitted development rights.

2 DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.1 The Site

2.1.1 The Site is located on the south of Yell which is the largest of the Shetlands North Islands (Figures 1.1 and 1.2). The area within the Application Boundary extends to approximately 1,135ha and is centred on the Burn of Hamnavoe at Grid Reference HU 50461 82092.

2.1.2 The land within the Application Boundary is owned by the Burravoe Estate and comprises 35 crofts. The majority of the Site is heather moorland interspersed with areas of bare peat, resulting from overgrazing.

2.1.3 The Site includes a number of watercourses, waterbodies and associated catchments. The majority of the Site is drained by the Burn of Hamnavoe and its tributaries, which discharge into Hamna Voe. The Site has an elevation of between 200m AOD at the Hill of Arisdale in the north to less than 10m AOD in the south. The majority of the Site lies between 80 to 150m AOD. There are no residential dwellings within the Site. To the south of the Site, the Application Boundary borders the settlements at Hamnavoe and Houlland.

2.2 Development description

2.2.1 The main components of the Proposed Development to which this OCEMP relates will comprise the following:

- 17 wind turbines with a tip height of up to 145m including foundations and transformers;
- Approximately 11.1km of access tracks of minimum width 4.5m and verges plus drainage ;
- Five major and one minor mapped watercourse crossings;
- Electrical substation and control building;
- Underground cabling connecting turbines to the substation and control building;
- One anemometry mast;
- Four borrow pits to provide aggregates for the construction of the wind farm; and
- A radio communications tower of up to 20m tall.

2.2.2 The following temporary elements would also be required during the construction phase of the Proposed Development:

- Temporary site compound for construction and storage
- Site office
- Temporary removal of road signage along the A968 and B9081.

2.2.3 The layout of the Proposed Development is shown on Figure 3.1 of the Environmental Statement. The total combined footprint of the abovementioned components is 25ha.

2.2.4 Grid references for the locations on the principal components of the Proposed Development are provided in Table 1.

Table 1: Component Locations

Component	Easting	Northing
Turbine 1	450453.7	1183369.1
Turbine 2	450654.4	1183105.0
Turbine 3	451093.7	1183089.3
Turbine 4	450670.3	1182757.1
Turbine 5	451343.3	1182860.5
Turbine 6	450909.8	1182524.9
Turbine 7	451627.1	1182659.2
Turbine 8	451079.4	1182242.7
Turbine 9	451997.9	1182487.6
Turbine 10	451678.5	1182109.2
Turbine 11	451232.6	1181946.1
Turbine 12	452190.1	1182208.3
Turbine 13	451965.9	1181817.7
Turbine 14	451476.7	1181722.8

Table 1: Component Locations		
Component	**Easting**	**Northing**
Turbine 15	452111.3	1181525.2
Turbine 16	451602.5	1181432.5
Turbine 17	452357.6	1181254.1
Anemometry Mast	450,950.0	1,182,799.9
Radio Communications Tower	452,758.0	1,180,788.0
Temporary Site Compound (*)	451,681.3	1,181,678.6
Control Building and Substation (*)	451,224.4	1,181,723.7
Site Access Point	448,600.6	1,181,188.9
Note * The coordinate indicates the centre point of the footprint area		

2.3 Key receptors

2.3.1 The ES notes that the Proposed Development will have the potential to effect upon a relatively small number of key receptors, which comprise:

- Red throated diver, the qualifying species for the Otterswick and Graveland Special Protection Area
- Merlin, a Red listed bird of Prey
- Peat and ground water dependant terrestrial ecosystems (GWDTE), where present within the Site.

2.3.2 Specific mitigation for the above receptors will be primarily contained within both the Habitat Management Plan (HMP) and the Peat Reinstatement Management Plan (PRMP), which will constitute a sub-section of the CEMP. The OCEMP and ultimately the CEMP will need to ensure that all construction activities are consistent with the mitigation measures outlined.

2.4 Development Programme

2.4.1 It is anticipated that construction of the Proposed Development would be undertaken over approximately 24 months, commencing in late 2018. The general sequence of construction activity would be as follows, although many tasks will be undertaken concurrently to minimise the duration of the construction programme:

- Agree final detailed CEMP with statutory stakeholders and Shetland Islands Council
- Complete all pre-construction surveys including further ground investigation and other assessments required by planning conditions.
- Construct general access roads and enhance sections of existing tracks.
- Establish the temporary compound construction area

- Obtain aggregate for borrow pits for use in tracks, turbine bases and hardstanding areas
- Construct approximately 11.1km of new access tracks, water crossings and crane platforms
- Construction of the wind turbine foundations
- Excavate the cable trenches and lay the power and instrumentation cables
- Install the grid connection (subject to separate consent process)
- Erect and commission the permanent anemometry mast
- Erect and commission the wind turbines
- Carry out reinstatement works
- Remove compounds and clear the Site for operation

3 CONSTRUCTION MANAGEMENT

3.1 Roles and Responsibilities

3.1.1 There are a number of roles that will be involved in the construction of the Proposed Development, all of which will be responsible for compliance with the CEMP where it is applicable to their relevant area of the construction process. These include:

- Project Manager
- Principal Contractor's Site Manager
- Ecological Clerk of Works (ECoW)
- Construction Design and Management co-ordinator
- Other roles associated with specialist technical elements of Proposed Development.

3.1.2 The responsibilities attached to the above-mentioned roles are expanded upon on the following section.

Project Manager

3.1.3 The Applicant's appointed Project Manager will be responsible for ensuring that all measures contained with the CEMP are appropriately implemented and that all staff and contractors adhere to the practices set out within it. In particular, the Project Manager will be responsible for:

- Ensuring the requirements of the CEMP are fully implemented across all relevant areas of the construction process.

- Ensuring contractors are aware of the key environmental constraints within and adjacent to the Site. For example, the close proximity of the SPA to the north as well as important cultural heritage sites close to the construction areas.
- Ensuring compliance with the CDM Regulations 2015.
- Appointing a qualified and competent Principal Contractor to build the works.
- Establishing roles and responsibilities in advance of the construction phase, including the requirements for any environmental specialist roles (i.e. Hydrologist, Archaeologist, Geotechnical Engineer and Environmental Health Specialist).
- Ensuring that qualified specialists are in place within the Principal Contractor's team to undertake environmental monitoring and reviewing of construction methods and required mitigation measures.
- Working alongside the Principal Contractor to review the CEMP as required throughout the construction period to take account of emerging good industry practice and on site conditions.

Principal Contractor's Site Manager

3.1.4 The construction works for the Proposed Development would fall under the CDM Regulations 2015. As such, the Principal Contractor will provide a Health & Safety Construction Plan in accordance with the CDM regulations. This plan will include, and not be limited to, a construction programme, emergency procedures, site layouts and fire plans, methods statements and details of the proposed induction programme.

3.1.5 The Principal Contractor will be responsible for the civil works of the Proposed Development, i.e. access tracks, turbine foundations, hardstanding areas, laydown areas and substation. The Principal Contractor will formally appoint a Site Manager prior to the construction. The Site Manager will be responsible for the day-to-day management of the Site, including ensuring environmental responsibilities are discharged and will report to the Project Manager. The duties of the Site Manager will include:

- Implement pre-construction surveys
- Prepare a detailed Construction Method Statement for individual works
- Carry out safety, health and environmental risk assessments for the construction works prior to commencement of construction activities.
- Prepare a programme of works, including those of sub-contractors for review and comment by the appropriate authorities and the Project Manager. This will take

account of sensitive work activities, potential weather delay periods and ecological, habitat and species protection requirements.

- Work with the Ecological Clerk of Works to inspect all operations to ensure that all potential ecological, hydrological, geotechnical and archaeological constraints have been identified, and/or mitigated for prior to the on-set of construction in that area.
- Ensure construction of the proposed scheme will proceed in accordance with the approved Plan, unless otherwise agreed in writing.
- The Principal Contractor will also be responsible for liaising with and obtaining all relevant consents, licenses, authorisation and permits to any construction at the Site.

Ecological Clerk of Works/Project Ecologist

3.1.6 The Ecological Clerk of Works (ECoW) will be responsible for the implementation of the HMP during the construction period and restoration period, and the ecological requirements of the CEMP.

3.1.7 The ECoW will monitor compliance with the CEMP and will report any breaches to the Project Manager who will have the authority to recommend stopping works and undertake remedial actions, if necessary to prevent or limit environmental damage. Duties will include:

- Ensure that the onsite mitigation to protect Red throated diver (adjacent SPA qualifying species), Merlin (Red listed bird of prey) and ground water dependant terrestrial ecosystems is implemented.
- Monitoring of all construction, pollution prevention and mitigation activities.
- Maintenance of Environmental Register which details issues identified by the ECoW, noting advice provided and steps taken on site to resolve them.
- Integration of construction activities with the Peat Reinstatement Management Plan (PRMP), in particular in relation to the placement of peat.
- Micro-siting works to minimise effects on peat and blanket bog.
- Check surveys at an appropriate time of year prior to the final micro-siting of turbine foundations and access tracks to ensure that any legally protected species and their resting places are protected from construction damage and/or disturbance.

- Pre-construction site surveys to identify any protected bird species breeding on site if construction activities take place during the bird breeding season (March until August) followed by the development and agreement of suitable measures with Scottish Natural Heritage to avoid harm to individual and their young or disturbance at nest sites.

CDM Co-ordinator

3.1.8 The construction works will fall under the Construction Design and Management (CDM) Regulations 2015. A CDM Co-ordinator will be appointed who will produce a pre-construction safety information pack in accordance with CDM regulations. This plan will detail the development construction programme, emergency procedures, site layout, fire plans, method statements and details of the proposed induction training programme.

Other Roles

3.1.9 The Applicant may retain a Site Representative who will liaise with the Project Manager.

3.1.10 An Electrical Contractor will be responsible for the installation and commissioning of the site cables and connections.

3.1.11 The selected Turbine Manufacturer will appoint a project management team who will liaise directly with the Project Manager and the Site Manager for the duration of the delivery and construction of the turbines.

3.1.12 Prior to the commencement of construction, the Principal Contractor will produce specific Contractors' Method Statements (CMS) for the Works. The CMS will be in addition to the CEMP and will be reviewed, amended and agreed by the Project Manager and the ECoW to ensure that all practices comply with this CEMP and good environmental practice.

4 PRELIMINARY SURVEYS AND GROUND INVESTIGATION

4.1.1 This section considers the surveys and ground investigations that will be carried out prior to the start of construction activities and after the Development Consent for the Site has been obtained. These surveys will inform the detailed design of the Proposed Development and additional environmental controls to be considered during the construction phase.

4.1.2

4.1 Targeted Otter Surveys

4.1.1 A targeted otter survey will be carried out by a qualified ecologist prior to commencement of construction works within a 250m buffer zone around proposed watercourse crossing locations and all other infrastructure. The surveys will be carried out to mitigate the potential destruction of, or disturbance to, otter breeding holts and resting places (offences under the Habitat Regulations 1994 (as amended) and the Wildlife and Countryside Act 1981 (as amended)).

4.1.2 Should any active 'structure or place used for shelter or protection' used by otters be discovered during the pre-construction survey, then works in the vicinity (within 30m) of the structure or place would be suspended and Scottish Natural Heritage (SNH) would be consulted immediately. If an otter structure is discovered beyond 30m of the construction work, then a 30m exclusion zone, inaccessible to any person, would be created in line with best practice. If it is suspected from pre-construction otter surveys that there were breeding otters then work would be suspended until it was established that they were not breeding, or the cubs were sufficiently old, or a larger exclusion zone (at least 100m) would be erected around the structure.

4.1.3 If the otter structure is located within 30m of the construction work or otter breeding is suspected then a European Protected Species (EPS) licence will be required for any construction work to continue, along with suitable mitigation or compensation works to be agreed with SNH.

4.2 Breeding Bird surveys

4.2.1 Pre-construction surveys will be carried out to help avoid disturbance to Schedule 1 (Wildlife and Countryside Act 1981 (as amended by the Nature Conservation (Scotland) Act 2004)) and Annex 1 breeding birds (Birds Directive). This survey will form the basis of a detailed Breeding Bird Protection Plan, which will be prepared post consent, to ensure that construction activities do not result in disturbance of important avian receptors present. Suitable disturbance free buffer zones will be identified around any Schedule 1 breeding birds locations if found to be present.

4.2.2 The Outline Habitat Management Plan (OHMP) has identified six potentially suitable candidate lochans in southern Yell for restoration work to provide suitable water levels for nesting by red-throated divers The restoration work can be undertaken when consent is granted for the Proposed Development, if possible before wind farm construction commences. The ECoW will ensure that restoration works are undertaken in the most appropriate time.

4.1 Baseline Water Quality Monitoring

4.1.1 Baseline water quality monitoring will be undertaken one year before the start of construction activities by a qualified hydrologist. Monitoring will be carried out at locations upstream and downstream of the proposed watercourse crossings (Refer to Figure 15.3 of the Environmental Statement) and would involve both a visual inspection and field monitoring using portable water sampling equipment. The following determinants would be monitored: pH; turbidity; dissolved oxygen (% saturation), Dissolved Organic Compounds (DOC) and; suspended solids (µS).

4.2 Ground Investigations

4.2.1 Detailed ground investigations and topographical surveys will be carried out to inform the detailed project design. The findings of the surveys will be used to optimise the layout by micro-siting certain elements and to provide details to be considered in the geotechnical design of the foundations, access tracks and borrow pits.

4.2.2 A comprehensive Ground Investigation will be undertaken prior to the Site construction works and will include trial pits and material sampling for foundation designs. Geotechnical investigations associated with the foundation design and an assessment of the degree of weathering the bedrock will also be undertaken to ensure that liquid concrete does not come into contact with underlying groundwater.

4.2.3 The ground investigations will also consider the location of the proposed borrow pits to confirm profiles and phasing, position of stock piles and over-burden and the detail of environmental protection measures.

4.3 Archaeological Watching Brief

4.3.1 An archaeological watching brief will be undertaken on a representative proportion of ground investigation works.

4.3.2 The purpose of such works will be to identify any archaeological remains threatened by the Proposed Development, to assess their significance and to mitigate any impact upon them either through avoidance or, if preservation in situ is not warranted, through preservation by record.

5 GENERAL SITE OPERATIONS

5.1.1 The following sections outline the measures that will be implemented during the site construction operations with the aim of ensuring ecological and environmental protection.

5.2 General Working Arrangements

5.2.1 Construction work will take place between 0700 to 1900 hours Monday to Friday and 0700 to 1300 hours on Saturdays though component delivery may take place outside these hours to avoid traffic disruption

5.2.2 There will be some periods where 24 hour working will be required, such as for erection of wind turbines and the exact arrangements will be agreed in advance with the Shetland Islands Council (SIC).

5.3 Health and Safety

5.3.1 The purpose of this section is to provide background information about Peel Energy's safety policies and to describe how safety issues are to be managed during the construction, operation and decommissioning of the Proposed Development.

5.3.2 Peel Energy is committed to taking a "*pro-active approach to excellence in health and safety"* (Peel Land and Property Health and Safety Policy, 2014), a commitment which also applies to the proposed Beaw Field Wind Farm. Wind energy has been proven to have a good safety record, with industry prepared guidelines in place to ensure this is maintained.

5.3.3 All risks associated with the construction and operation of the Proposed Development can be avoided, mitigated against or safely managed through effective design and the use of appropriate management systems and codes of conduct.

5.3.4 A wide range of legislation and guidance is available for the consideration of risks to health and safety. The key guidance for the onshore wind industry is the 'Onshore Wind Health and Safety Guidelines' (OWHSG), which was produced by RenewableUK in 2015. These Guidelines support the strategic vision of RenewableUK: *"to continue to be a leading enabler in the delivery of an expanding UK wind, wave and tidal sector free of fatalities, injuries, work related ill-health and environmental incidents.*", as well as "*Ensuring that Health & Safety and Environmental Protection remain as a top priority throughout all sectors of the industry".* These guidelines cover the whole project lifecycle from construction through to decommissioning.

5.3.5 The OWHSG were developed by taking account of existing and emerging industry good practice, within the framework of UK health and safety legislation, specifically the Health and Safety at Work Act 1974 and subsequent regulations. A list of these regulations in relation to the industry is provided in Table 2 below, which has been adapted from the OWHSG.

Table 2 : Summary of legislation relating to onshore wind Health and Safety

EU Directive	Principal GB Regulation
Framework (89/391/EC)	Management of Health and Safety at Work Regulations 1999
Workplace (89/654/EEC)	Workplace (Health, Safety and Welfare) Regulations 1992
Work equipment (89/655/EEC, superseded by 2009/104/EC)	Provision and Use of Work Equipment Regulations 1998
	Lifting Operations and Lifting Equipment Regulations 1998
PPE (89/656/EEC)	Personal Protective Equipment at Work Regulations 1992
Manual Handling (90/269/EEC)	Manual Handling Operations Regulations 1992
Noise (2003/10/EC)	Control of Noise at Work Regulations 2005
Vibration (2002/44/EC)	Control of Vibration at Work Regulations 2005
Temporary or Mobile Construction Sites (92/57/EEC)	The Construction (Design and Management) Regulations 2007
Safety and / or health signs (92/58/EEC)	Health and Safety (Safety signs and signals) Regulations 1996
2001/45/EC - provisions concerning the use of work equipment provided for temporary work at a height	The Work at Height Regulations 2005

Implementation of Health and Safety Legislation and Guidance

5.3.6 Should the Proposed Development be consented it would be ensured that the appropriate resources required to implement health and safety legislation and guidance on site would be made available. Peel Energy is committed to maintaining an excellent health and safety record and the safety of workers and the public throughout the lifetime of the Proposed Development would be of paramount importance. The guidance identified above would be followed rigorously, and health and safety records would be maintained.

5.3.7 The Proposed Development would have a Quality, Health, Safety and Environmental Management Policy (QHSE) in place before construction commenced, to cover the construction, operational and decommissioning phases in accordance with recognised standards such as OHSAS 18001:2007 and ISO 14001:2015. This would set out how the site is to be controlled and operated to protect the health and safety of the public and the workforce, and minimise impacts on the environment in and around it. All work

would be planned in advance and risk assessments carried out. The policy would cover investigation of incidents and near-incidents and active auditing and inspection to ensure that work was being carried out in accordance with the QHSE policy.

5.3.8 All subcontractors would be required to sign up to the QHSE policy, to ensure the same standards were applied across the project.

5.3.9 The development of this Outline Construction Environmental Management Plan (OCEMP) for the project focusses on environmental issues. This would be an integral part of the overall QHSE policy and management system.

Workforce and equipment safety during the construction phase

5.3.10 A "toolbox talk" would be undertaken each day by the site manager or their designated (e.g. foreman) representative to implement the QHSE Policy and the CEMP, and to alert the workforce of any hazards and changes to the site.

5.3.11 Personal Protective Equipment (PPE) would be worn at all times on site to further reduce risks and a comprehensive risk assessment would be undertaken by the site manager prior to construction. The workforce would be checked for competence and trained on the site-specific procedures before starting work, and continually trained throughout the project. The project would fully comply with the Construction (Design and Management) Regulations 2015.

5.3.12 Welfare facilities such as toilets and a site office would be provided during the construction and decommissioning phases.

5.3.13 Due to the nature of the Proposed Development, workers will occasionally be required to work at a height. In all instances it will be a mandatory pre-requisite for the staff member involved in working at height to have been properly trained to work safely in these conditions. A comprehensive risk assessment will be carried out prior to any activity taking place at height. In all cases suitable PPE will be worn including harnesses and ropes where necessary, and any ropes and climbing equipment will be maintained in good working order and regularly checked.

5.3.14 No staff member will climb the turbine whilst it is operational or while the blades are rotating. If it is necessary for maintenance purposes to access the generator or other equipment in the hub the turbine will first be stopped and yawed out of the wind. In wind speeds greater than 7 m/s then no activity will be undertaken on the outside of the turbine hub. Any personnel working at height will not be allowed to work alone and will be accompanied by at least one other member of staff at all times.

5.3.15 A comprehensive demobilisation plan for the work would be drawn up in advance to ensure safety of the public and workforce and the best use of available techniques at that time. This plan would be submitted for approval by the appropriate organisations.

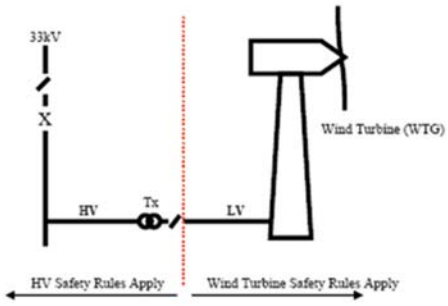
5.3.16 In addition, a detailed traffic management plan including a site speed limit of 15mph will be produced in order to reduce risks associated with road traffic.

Workforce and Equipment Safety During the Operational Phase

5.3.17 RenewableUK has published a document outlining procedures to ensure safe operation of wind farms known as the Wind Turbine Safety Rules (WTSR)[ii].

5.3.18 It is the intention that the WTSR, "when implemented correctly and appropriately, will:

- *Represent industry good practice for safeguarding employees from the inherent dangers that exist from installed electrical and mechanical equipment in wind turbines;*
- *Assist in the development and application of safe systems of work in a consistent manner; and*
- *Provide a robust approach to demonstrating legal compliance with relevant health and safety regulations."*
- The WTSR provide a single way of managing operational safety, giving owners and wind turbine maintenance service providers a consistent and auditable process across their UK portfolios.



5.3.19 A wind farm consists of two distinct systems: the high voltage (HV) infrastructure and the wind turbines with their associated low voltage (LV) infrastructure. The WTSR will be implemented for the wind turbine and associated LV infrastructure. To carry out work on equipment in a wind turbine, the WTSR require Approved Written Procedures (AWP's) to be put in place for each work package significant enough to warrant it. An AWP is a procedure which specifies how work on plant and apparatus below 1000V AC or 1500V DC, which requires safety precautions to be taken, will be carried out safely. It is similar to a method statement and it includes checkpoint signatures as auditable proof that precautions were taken and work was completed. The WTSR's also give guidance on where AWP's are required and where they are not necessary.

Public Safety

5.3.20 The Proposed Development site is currently not crossed by any formal footpaths. However, under the Land Reform (Scotland) Act 2003, and the 2015 Land Reform Bill, members of the public could still access the site. The Site would also continue to be used by Crofters. Although it is not possible or desirable to prevent members of the public accessing the site, a duty of care would lie with the developer and all appropriate action must be undertaken to protect anyone who does visit.

5.3.21 During the construction and decommissioning phase (and any periods of major maintenance), areas around the turbines would be restricted to the public as is industry standard for construction sites. During the operational phase, the site would be accessible to the public and would continue to be used by Crofters. Signs would be erected around the site to alert the public of site safety precautions.

5.3.22 The high voltage network connecting the wind turbines to the switchroom would be installed in accordance with normal UK high voltage procedures including The Electrical Safety, Quality and Continuity Regulations 2002 (ESQCR) and operated in accordance with UK electrical standards and guidelines. They would present no hazard different from any other electrical distribution network.

5.3.23 A full traffic management scheme will be implemented both on and off site in order to minimise risks associated with road traffic.

Risk Assessment and Management

5.3.24 Before work starts on-site, the Principal Contractor would safety, health and environmental risks associated with construction phase.. Where these risks cannot be reduced to a low level, control measures would be put in place.

Other Issues

Topple

5.3.25 It is highly unusual for wind turbines to experience flaws that would cause them to topple over. This is especially true of the larger wind turbines which have undergone rigorous design and testing procedures.

5.3.26 In order to minimise any potential risks various offsets have been applied to surface features such as roads, footpaths, the substation, and buildings to ensure that, even in the unlikely event of catastrophic failure of the tower or foundation then there is no risk of a turbine toppling over on to the feature. Such a margin of safety is not

envisaged to ever be needed but it does represent a precautionary approach. The turbines would be located at least "topple" distance apart from each other and from major infrastructure and buildings, as per industry standards.

Ice throw

5.3.27 The accumulation of ice is highly dependent on local weather conditions and the turbine's operational state. Any ice that is accumulated may be shed from the turbine due to both gravity and the mechanical forces of the rotating blades. An increase in ambient temperature, wind or solar radiation may cause sheets or fragments of ice to loosen and fall, making the area directly under the rotor subject to the greatest risks. In addition, rotating turbine blades may propel ice fragments some distance from the turbine. It must be borne in mind however, that the actual distance travelled by the ice fragment is a very complex function of factors such as local topography, wind direction and strength, ice fragment shape, release angle and rotational speed. The risk of ice throw will be taken into account during both project planning and wind farm operation and prevention measures will be installed on some or all of the turbines if deemed appropriate.

Blade throw

5.3.28 Although it is an extremely rare occurrence, there have been documented cases of wind turbine blades failing. In such circumstances detached blades or fragments have been shown to be capable of travelling over appreciable distances. The actual distance travelled by the blade fragment is however, a very complex function of factors such as local topography, wind direction and strength, blade fragment profile, release angle and rotational speed at failure. It is therefore, not possible to 'generalise' from reported instances of blade failure as each case is unique.

5.3.29 Lightning Strike

5.3.30 Additionally, structural failures can occur (HSE investigated two turbine collapses late in 2007) and turbines are prone to being struck by lightning, which in severe cases could cause damage and fire. Modern wind turbines are – as a matter of basic design – fitted with lightning strike protection measures which dramatically reduce the possibility of a strike occasioning a fire incident.

Conclusion

5.3.31 The wind energy industry has a good safety record. The industry has prepared health and safety guidelines in conjunction with the Health and Safety Executive, Health &

Safety in the Wind Energy Industry Guidelines (British Wind Energy Association 2005, Amended 2008) and Peel Energy would implement these guidelines and other best practice on the site so that no likely significant effects are predicted from any safety related matters. Further, the turbines are located sufficiently far away from other infrastructure or receptors and therefore the issues relating to blade failure, topple, lightning strike, ice throw are not considered to be significant for the Proposed Development.

5.4 Micro-Siting Works

5.4.1 As a result of ongoing environmental surveys, as well as ongoing detailed design of infrastructure, micro-siting of turbines and access tracks will be carried out using a 50m allowance. When considering the need for micro-siting the best practice principles listed below will be followed.

- Take account of buffer zones and timing constraints when works are in proximity to known breeding bird areas.
- Avoid important habitat areas.
- Avoid localised topographic constraints (steep slopes etc).
- Consider the proximity to residential properties.
- Identify and avoid other important bird areas.
- Avoid areas (or adopt appropriate mitigation) which have known records of protected species (i.e. otters.) - to be confirmed by pre-construction surveys where relevant.
- Avoid, where possible, sites of archaeological interest.
- Avoid areas where potential for works to create silt and pollution of watercourses is increased.
- Mark out access routes avoiding sensitive areas where possible (e.g. flushes, drainage channels, ditches, steep slopes). Ensure that access routes are as short as possible.

5.5 Storage of Oils and Fuels

5.5.1 The storage and handling of oils and fuels will be undertaken in accordance with the following Pollution Prevention Guidance (PPG) notes:

- PPG02 Above Ground Oil Storage Tanks;
- PPG03 Use and Design of Oil Separators in Surface Water Drainage Systems;

- PPG07 Refuelling Facilities;
- PPG08 Safe Storage and Disposal of used Oils; and
- PPG26 Storage, Handling of Drums and Intermediate Bulk Containers.

5.5.2 Minimal amounts of fuels, oils and other potential contaminants will be stored at the Site compound. These will be stored in secure designated storage areas and in accordance with the appropriate regulatory requirements, including Control of Substances Hazardous to Health (COSHH Regulations 1994). In accordance with PPG03, PPG08 and PPG26 these will be sited on an impermeable base within an oil-tight bund, which will be capable of containing 110% of the volume of the oil container. The bunded area will be cleared regularly to limit the build-up of residues and if necessary, waste will be disposed of through a specialised contractor.

5.5.3 During the operation of the development, potential contaminants within the turbine housing will be stored on impermeable hardstanding and containment measures will be in line with the guidance contained with the PPGs referred to above. The interior structure will include a drainage system, which will incorporate an oil interceptor to contain any spillages should they occur.

5.5.4 In order to prevent materials leaking from static plant, such as pumps and generators, contaminating the ground and being washed into watercourses, static plant will be placed on drip trays wherever practicable. Facilities for washing plant and equipment contaminated with mud will be provided. Wash water from the facilities will be managed so as to prevent pollution of surface water and groundwater.

5.5.5 Any oil or similar material will be cleaned immediately if spilled, using appropriate absorbent material to prevent it entering any local watercourse. Oil spill kits will be provided and training on their use given to all Site personnel.

5.6 Concrete Batching

5.6.1 Concrete batching will be undertaken onsite within the Site compound.

5.6.2 When operating an onsite batching plant, particulate matter and wastewater runoff are primary pollutants of concern. Point source emissions may occur during the transfer of material to silos, the transfer of sand and aggregate, truck loading, mixer loading, vehicle traffic, and wind erosion from sand and aggregate storage piles. Potential batching plant wastewater and runoff pollutants include cement, sand, aggregates, chemical additive mixtures, fuels and lubricants.

5.6.3 Suitable pollution prevention measures will be developed in conjunction with the ECoW, and installed prior to the operation of the batching plant, including but not limited to the following;

- Wastewater collection system to prevent contamination of local watercourses;
- Dust prevention measures to include water sprays, enclosures, hoods, curtains, shrouds, movable and telescoping chutes, fabric filters, etc.;
- Enclose all free falling transfer points from conveyors to stockpiles with chute(s) and apply dust suppression materials at these points (suppression agents, water spray);
- Load concrete trucks in a way to minimise airborne dust emissions;
- Pre-mix materials in a totally enclosed concrete mixer before loading the materials into the concrete truck;
- Provide equipment necessary to clean all concrete trucks and other vehicles after loading (preferably dry cleaning methods) and before exit from the property to wash off any dust and/or mud deposited on the wheels and/or vehicle body;
- Maintain all equipment, including dust/particulate collection equipment, according to manufacturer's recommendations to prevent leaks;
- Keep a routine maintenance log onsite of all equipment/filter systems, recording date and time of all corrective actions; and
- Provision of integrated quality, safety and environmental management systems for the Site, operation of the plant, and delivery processes.

5.7 Silt Traps

5.7.1 Silt traps, where deemed necessary, will be used to prevent construction stage materials entering the natural watercourses within the Site.

5.7.2 Pumping rates will be adjusted to allow settlement of any solids prior to discharge of water from the traps.

5.7.3 A programme of routine surface water sampling and regular inspection of silt traps will be put in place to monitor surface water management during the construction stage. Settlement lagoons will be employed in areas where the level of runoff is likely to exceed levels normally contained within a silt trap. These are to be agreed with the ECoW prior to commencement.

5.7.4 Waste Management

5.7.5 Waste stored on site will be segregated according to its type to prevent cross-contamination of controlled wastes and special wastes. Waste will be stored in covered skips to prevent dust and litter being blown out and to prevent accumulation of rainwater. Separate storage facilities for waste to be recycled will also be provided by the Principal Contractor.

5.7.6 Where possible, packaging materials will be removed prior to onward transportation to working areas, or else all the packaging waste will be removed from the working area on the same day the waste is generated. Pipe cuttings and other waste generated from the construction will be removed from the working area as quickly as possible.

5.7.7 Waste will be disposed of at licensed waste facilities with the movement of waste being carried out by licensed waste carriers only. All waste will be managed, controlled and disposed of following the appropriate waste management legislation.

5.8 Contaminated Waste

5.8.1 Due to the nature of the Site it is very unlikely that any existing contaminated land will be encountered during construction works. Should this not be the case, the Contractor will carry out the construction works in such a way as to prevent any adverse impacts arising from the presence of contaminated land / material during construction activities. All contaminated sites and the hazards that they present will be identified in consultation with the SIC's contaminated land officer.

5.8.2 If contaminated material is excavated, it will be necessary to determine the concentrations of any contaminants. Once this has been carried out the results will be used to classify the materials as hazardous or not following SEPA's WM3 Technical Guidance[iii]. This will allow the material to be handled and disposed of in accordance with the appropriate legislation including the Special Waste (Scotland) Regulations 1996. If concentrations of contaminants allow the waste to be utilised elsewhere on site, advice will be sought from SEPA. An exemption under the Waste Management Licensing Regulations 1994 may be required before the use of any such materials on site. Where contaminated materials require disposal, disposal will be to a licensed waste disposal site and all parties will discharge their statutory obligations in relation to the waste management Duty of Care, imposed by Section 34 of the Environmental Protection Act 1990, etc. and the Special Waste (Scotland) Regulations 1996.

6 ENVIRONMENTAL SITE MANAGEMENT PRACTICES

6.1.1 The following sections describe mitigation control measures that will be incorporated to protect the environment.

6.2 Ecology

6.2.1 Prior to intrusive ground investigations and subsequent construction stages, the ECoW will provide ecological training and raise the awareness of the construction staff about site specific ecological issues through induction procedures. The construction work programme will be informed by bird breeding season and will be designed to avoid periods of high sensitivity for protected species where practical. The ECoW will also ensure that opportunities to avoid sensitive habitats during construction are identified and taken into consideration.

6.2.2 Any micro-siting activities will be discussed and agreed with the ECoW to ensure that they avoid areas of sensitive habitats such as GWDTE wherever possible.

6.2.3 In order to minimise the effects of construction (e.g. disturbance from works), all activity will be confined to clearly defined working areas, especially in areas next to watercourses and water bodies and a 50m marked exclusion zone will be adopted for all potentially at-risk watercourses and water bodies.

6.2.4 All water crossings are to be designed in accordance with SEPA's best practice guidance. This includes allowing for the easy and safe passage of otters under rather than over bridges and culverts by leaving spaces for ledges and providing ramps at either end of bridges and culverts. Where bridge crossings are impractical, and culverts are considered necessary, their design would allow for plenty of air space above water during times of flood. If this is not possible, alternative and parallel tunnels to provide an alternative route for otters to move without being forced to cross roads will be provided. Natural hydrological conditions will be restored as far as possible.

6.2.5 The Site-based construction and maintenance vehicle speed limit would be 15mph to reduce any potential for otter road traffic injuries and mortalities, as well as for more general site safety reasons. When not operational, protection from entrapment in open excavations and pipes will be provided to further reduce incidences of harm to otters.

6.2.6 All works causing ground disturbance will follow best practice techniques of vegetation and habitat reinstatement. Early restoration of all disturbed areas (e.g. by

covering exposed peat with acrotelm from donor areas within the construction footprint) would be undertaken to minimise the effects of peat exposure erosion.

6.3 Ornithology

6.3.1 Monitoring of a range of ornithological receptors needs to take place prior to construction, during construction and during operation. As a general principle, SNH's post-consent and post-construction monitoring guidance (SNH, 2009) (or any subsequent updates) will be followed and agreed with SIC. The ECoW will monitor the works at each phase of the construction programme.

6.3.2 A Breeding Bird Protection Plan (BBPP) will be prepared prior to construction, with input from SNH and will follow its best practice guidance (currently outlined in on-line guidance entitled 'Dealing with construction and breeding birds'[iv]) to ensure breeding birds and their nests are not disturbed, damaged or destroyed during construction.

6.3.3 For protection of Red Throated Divers, six potentially suitable candidate lochans in southern Yell have been identified for restoration work. Landowner liaison has taken place and long-term agreements (for the life-time of the Beaw Field Wind Farm) will be secured for the planned conservation work. If and when consent is granted for the Beaw Field Wind Farm, planned OHMP work on these lochans will begin as soon as is practicable. When restored, each of the lochans will quickly provide suitable water levels for nesting by red-throated divers. This will help in restoring the Diver breeding lochans which over the last decades have been lost due to overgrazing and erosion of peat in Shetland.

6.3.4 During ornithological surveys (2011-2015) two active merlin territories were identified in southern Yell but neither was regularly occupied throughout the study period. Two additional unoccupied, former territories were also identified on east facing slopes of West Hill in Aris Dale and Stouraclev in Canis Dale.

6.3.5 It is intended that merlin nesting habitat quality will be improved by creating exclusion zones with fences to restrict livestock from currently unoccupied territories and by the expansion of woodland areas with native broadleaved trees along approximately 1km of the banks of Burn of Aris Dale. The two selected sites for merlin habitat restoration have been selected as they are intrinsically attractive to nesting merlin in terms of their slope, aspect and position in the landscape. Further, the sites are located at a distance sufficient to avoid disturbance during construction and operation of the wind farm.

6.3.6 Monitoring on ornithological receptors will include vegetation supervision to audit the effectiveness of habitat restoration and enhancement measures.

6.4 Peat handling, storage and restoration

6.4.1 The majority of the Site is typical of Scottish uplands and Shetland with mixture of dry and wet modified bogs interspersed with areas of bare peat, resulting from overgrazing. Habitats within the Site are characterised by blanket bog, degraded blanket bog and moorland pasture with more extensive areas of deep peat on higher ground to the west of the Site. Blanket bog has been identified as a priority habitat by the Scottish Planning Policy (SPP).

6.4.2 The construction activities may result in loss and fragmentation of peatland, destabilisation of the peat resource, loss of carbon source contained within the undisturbed peat. To minimise the potential impacts on peat resources associated with the Proposed Development, an Outline Peat Reinstatement and Management Plan (OPRMP) has been prepared in accordance with the good practice guidance and in addition to the mitigation measures specified in Section 12.8 of the Environmental Statement. The OPRMP provides detailed management measures regarding handling, management, temporary storage and restoration of peat. The OPRMP has been provided as Annex 1 and will be implemented by the ECoW. A detailed Peat Reinstatement Management Plan will be prepared prior to commencing the construction works and after the grant of consent.

6.5 Cultural Heritage and Archaeology

6.5.1 Direct impacts on two known heritage features are anticipated due to activities relating to the Proposed Development and include potential dissection of prehistoric field boundary at Hamnavoe (Site 88) by an internal access track and the potential removal of part of a former field boundary of unknown date at the Heogals (Site 158). The presence of extensive peat cover across the Site indicates the potential for historic environmental evidence to be contained within and underlying the peat. Additionally, remains of prehistoric to post-medieval date in and around the Site indicate the potential for sub-surface archaeological deposits and features to exist.

6.5.2 All known heritage assets within 50m of the Proposed Development will be fenced off under archaeological supervision prior to the start of the construction phase in order to avoid accidental damage by heavy plant movement. The proposed fencing will include protection of a possible cairn (Site 128); two plantiecrubs (Sites 84 and 89) and two features of indeterminate origin (Site 130 and 131). Site 88 and its immediate

surroundings will be subject to geophysical and topographical surveys to record the extent of this feature and any detectable below ground remains prior to the commencement of construction works in its vicinity. Following survey, all elements relating to the feature not located within the direct path of the proposed access track will be fenced off to avoid inadvertent damage to them by plant movement during access track construction. A watching brief during ground-breaking works in the vicinity of this feature will ensure that any further remains relating to it are recorded.

6.5.3 Given the potential for presently unknown archaeological remains, in particular prehistoric and post-medieval date, a programme of archaeological works to investigate and mitigate against the possibility of uncovering hitherto unknown remains will be undertaken. The programme will be submitted to Shetland Island council as part of a written scheme of investigation.

6.6 Hydrology and Hydrogeology

6.6.1 A number of watercourses and waterbodies are associated with the Site. It is anticipated that mains supply will be available for undertaking construction works for the Proposed Development. If mains supply is not available, a private water supply will be secured along with the appropriate licence from SEPA.

Water quality monitoring

6.6.2 Considering the potential of the construction activities associated with the Proposed Development, water quality monitoring will be undertaken upstream and downstream of the proposed watercourse crossings as shown on Figure 15.3 of the ES, subject to agreement with SEPA and SIC. Monitoring would be carried out during the construction phase and analysis would include both visual and field monitoring using portable water sampling equipment undertaken by an experienced hydrologist.

6.6.3 The results of the sampling, including the visual checks, will be entered into a spreadsheet and a copy provided to the Shetland Islands Council and SEPA on a monthly basis.

6.6.4 During the construction period, the ECoW or other nominated person will carry out a daily visual check of the watercourses adjacent to the Proposed Development for the following parameters:

- Oils;
- Scum;
- Turbidity; and

- Algal blooms.

6.6.5 Where necessary additional monitoring using the portable equipment will be carried out if any issues are identified during the visual inspections.

6.6.6 Samples will be collected by a nominated person trained in the use of the portable equipment. The equipment will be used in accordance with the manufacturer's recommendations including calibration and cleaning. The sample will be collected in a clean container by the individual, wearing gloves. Care will be taken to ensure that the sediment or vegetation is not disturbed during sample collection. The following parameters will be monitored using portable equipment:

- Turbidity;
- Dissolved Organic Compounds (DOC) (mg/l);
- Dissolved oxygen (% saturation);
- Suspended solids (mg/l);
- pH; and
- Conductivity (µS).

6.6.7 If acceptable values for the above parameters are exceeded, SEPA will be informed of the issue(s) and the Project Manager will seek to identify the source of the problem. If the source is outwith the 50m upstream limit, SEPA will be informed.

6.6.8 If the source of the problem is found to be associated with any of the construction activities related to the Proposed Development, the construction activities most likely to have occasioned the problem(s) will be curtailed whilst a detailed investigation will be carried out. Full-scale work will not recommence until SEPA is content that the issue has been dealt with and is unlikely to re-occur.

Groundwater Levels

6.6.9 An array of piezometers will be installed within the peat between excavations for turbines, borrow pits and the potential GWDTE prior to construction and will be monitored during construction and for the initial years of operation. For each of the turbines and borrow pits, it is recommended that a piezometer is installed upslope of the excavation to act as a control, one is installed in the immediate surrounding area of the turbine/ borrow pit and one is installed downslope of the excavations and potential GWDTE. The monitoring of water levels would demonstrate whether the

local hydraulic gradients and hydrological connectivity with the potential GWDTE is being maintained.

6.6.10 The results of the sampling will be entered into a spreadsheet and a copy provided to the Shetland Islands Council and SEPA on a monthly basis.

6.7 Noise and vibration

6.7.1 To ensure construction noise is minimised, the Principal Contractor will undertake all works in accordance with British Standard (BS) 5228. Local residents will be informed of the proposed working schedule, including the times and duration of any abnormally noisy activity that may cause concern.

6.7.2 Noise emanating from the construction activities will not exceed the noise limits provided in Table 3.

6.7.3 The PC will ensure that all equipment is fitted with suitable exhaust silencers and or muffler equipment and that enclosure panels are kept closed whilst the equipment is in use. The machines will be shut down between work periods or throttled down to a minimum.

6.7.4 Part 1 2009+A1:2014 gives detailed advice on methods of minimising nuisance from construction noise and will be adopted. Noise control measures will include reduction at source, control of noise spread, insulation at receptors.

Table 3 :Noise Level Schedule

Period	Noise* (LAeq)	Period of Hours over which LAeq is applicable
Mondays to Fridays	65	07:00 to 19:00
Saturday	55	07:00 to 13:00
Sundays and Bank Holidays		No working unless agreed in writing
*- Noise levels prescribed for point 1 metre in front of the windows of any occupied building		

6.8 Highways and Transportation

6.8.1 The Proposed Development would take access via a new junction with the B9081 approximately 3.5km north east of the Ulsta Ferry Terminal. Construction traffic would use the A968 and B9081 on Yell to access the Site and based on the locations of potential suppliers of materials, it is also likely that the A968, B9076 and A970 on Mainland would be used by construction traffic. The Design and Access Statement and Chapter 18 of the ES provides details regarding the access routes to be used during the construction phase of the Proposed Development.

6.8.2 In order to minimise the potential for accidents at the access to the Site and along the delivery route during the construction period, a detailed Construction Traffic

Management Plan (CTMP) will be prepared by the Principal Contractor and will be agreed with the Shetland Islands Council prior to commencement of construction activities.

6.8.3 Specific training and disciplinary measures will be established to ensure the highest standards are maintained to prevent construction vehicles from carrying mud and debris onto the carriageway. Appropriate traffic management measures will be put in place on the A968 and B9081 to avoid conflict with general traffic and pedestrians using the length of the B9081 which forms part of the walking route, subject to the agreement of the roads authority. Typical measures will include HGV Turning and Crossing signs and / or banksmen at the site access and warning signs. A voluntary speed limit of 30mph will be adopted for all construction vehicles on the road network between Ulsta and the site access.

6.8.4 Appropriate traffic management measures will be put in place on the site access road once constructed to avoid conflict with pedestrians using the walking route. The B9081 will be widened and passing places will be developed. Construction updates will be provided on the project website and a newsletter to be distributed to residents on Yell.

6.8.5 All project drivers will be required to attend an induction to include:

- a safety briefing;
- the need for appropriate care and speed control;
- a briefing on driver speed reduction agreements (to slow site traffic at sensitive locations);
- identification of specific sensitive areas;
- identification of the specified route; and
- the requirement not to deviate from the specified route.

6.8.6 The Abnormal Indivisible Load (AIL) vehicles will be escorted along the route by the Police or by dedicated escort vehicles. This standard practice will ensure that other road users are appropriately held clear of the AILs and released once it is safe to do so. The escort vehicles will travel ahead to ensure that junctions and narrow sections of road are clear from vehicles shortly before the AIL vehicles. Once entering the Site, a 15mph speed limit will be imposed on all users of the Site. Parking for site operatives and visitors will be established at the compound.

6.8.7 Video footage of the pre-construction phase condition of the abnormal loads access route and the construction vehicles route would be recorded to provide a baseline of the state of the road prior to any construction work commencing. This baseline would inform any change in the road condition during the construction stage of the Proposed Development. Any necessary repairs would be coordinated with the Roads Authority. Any damage caused by traffic associated with the Proposed Development during the construction period that would be hazardous to public traffic would be repaired immediately.

6.8.8 Road improvements will be carried out in agreement with SIC and the appropriate statutory authorities to ensure that during delivery of turbine components minimal damage is caused to road surfaces, verges, street furniture and surrounding vegetation. Damage to road infrastructure caused directly by construction traffic will be made good and street furniture that is removed on a temporary basis will be fully reinstated. A road edge review will be carried out on a daily basis and any debris and mud will be removed from the carriageway.

6.9 Public Access

6.9.1 There are two designated core footpaths, one at the north and the other one at the south of the Site and two waymarked footpaths, one leading to the Catalina Memorial and the other one leading to Otterswick Ward. There are also a number of unclassified roads/tracks with the Site used by local crofters for farm access.

6.9.2 The paths adjacent to the access roads into the Site will be monitored to ensure that mud or other debris is not tracked out of the Site. A sweeper will be on standby in order that any mud or debris tracked onto adjacent roads is dealt with in a timely manner.

6.9.3 Signs will be erected warning visitors and walkers of the presence of construction work. Information signs detailing works and giving the PC team contact number details will be maintained throughout the construction site.

6.10 Dust Control

6.10.1 Good practice measures will be adopted during construction to control the generation and dispersion of dust such that significant impacts on neighbouring habitats should not occur. The Principal Contractor will be responsible for developing and implementing a Dust Management Plan (DMP) for the construction stage. The DMP will incorporate but will not be limited to the mitigation measures included in Section

17.8 of the ES. Specific mitigation measures are proposed for the construction and operation of borrow pits.

7 OUTLINE CONSTRUCTION ACTIVITIES

7.1 Construction Compounds and Laydown Areas

7.1.1 During the construction period a temporary site compound / laydown area will be constructed and will include the following:

- Temporary Portacabins to be used for site offices, welfare facilities and also the monitoring of incoming vehicles;
- Temporary storage area for construction materials;
- Temporary storage area for turbine components;
- Parking for construction staff, visitors and construction vehicles;
- A secure tool store and workshop (lockable containers) for workers/subcontractors, situated at a location to be agreed with the Principal Contractor. These tool stores will provide a safe and sheltered working area for maintenance and repair work;
- Temporary Concrete Batching Plant; and
- A receiving area for incoming vehicles.

7.1.2 The location of the construction compound has been strategically selected to have appropriate separation distances from any watercourses/waterbodies (Refer to Figure 3.1). The site identified for construction compound also avoids areas of peat.

7.1.3 An area adjacent to the site compound has been identified as an area for peat reinstatement. This area will be prepared along with the construction of site compound. A perimeter fence will be introduced and internal bunds created to allow reinstatement of catotelm peat to a depth of less than 1.5m between the bunds followed by a layer of acotelm placed over the surface. Refer Annex 1 (PRMP) for additional details.

7.1.4 The compound will be fenced and topped with additional security features (i.e. razor wire) and surfaced with compacted hard-core. Sanitary conveniences and washing facilities will be provided for all staff and visitors attending the sites. The conveniences and rooms containing them will be regularly cleaned to a suitable standard.

7.1.5 The design and siting of site offices and facilities will consider the orientation of the cabins to make the best use of sunlight in order to reduce electricity consumption.

Where and when compound lighting is required, it will be specified and located to minimise light pollution to the surrounding area. All lights will face inwards.

7.1.6 The un-contaminated surface runoff from the compound will be accommodated in a shallow swale or soak-away, which will be constructed as a perimeter ditch to avoid contamination of watercourses should there be a spillage. An oil interceptor will be installed at the site compound. All other runoff from the site will follow natural drainage patterns and newly installed drainage routes.

7.1.7 The compound and laydown areas will be reinstated at the end of the construction period.

7.2 Borrow Pits

7.2.1 A total of four borrow pits have been identified within the Application Boundary to provide aggregates for the construction of the wind farm (Refer to ES Figures 3.16-3.19). The selection of sites for borrow pits was a result of a thorough examination of the site constraints such as access, peat depths, sensitive habitats, archaeological importance, landscape and visual impact and geological resources.

7.2.2 Materials excavated from the borrow pit during the initial phase will be used principally in construction of new access tracks to approach the turbine locations. During the main construction phase, materials will be used for:

- construction of access tracks to turbines;
- formation of hard standings for cranes; and
- backfilling to turbine foundation excavations.

7.2.3 Based on a review of the existing access routes available within the Application Boundary, the following schedule will be adopted for establishment of borrow pits and associated activities:

- establishment of borrow pit BP1;
- construction of access track between borrow pit BP1 and BP2;
- establishment of borrow pit BP2;
- establishment of a temporary compound on existing prepared area;
- establishment of borrow pits BP3 and BP4;
- construction of new access tracks and water course crossings;
- construction of wind turbine foundations; and
- Construction of hardstanding areas.

7.2.4 The key features of the borrow pits have been summarised in Table 4.

Table 4: Borrow Pits – Key Features

Borrow Pit	Borrow Pit Area (Ha)	Rock extraction Area (Ha)	Distance to nearest GWDTE (m)	Distance to nearest blanket bog (m)
Borrow Pit -1	1.505	0.911	166	1200
Borrow Pit -2	2.770	1.40	130	300
Borrow Pit -3	2.320	1.49	40	145
Borrow Pit -4	1.150	0.66	350	0

7.2.5 Detailed site investigations will be carried out for each borrow pit but it is anticipated that the primary rock extraction will require blasting and is likely to be above ground water and will be worked dry. The borrow pits will be worked in one or two 'benches'. Faces will be formed at the natural angle of repose of the material in order to maintain a safe working environment. A minimum of 1.5m high safety bund will be provided as an edge protection on all benches and haul roads.

7.2.6 The processed rock will be stored on the borrow pit floor in piles of maximum 5m high before being transported for construction works for the Proposed Development. The daily operation and management of the borrow pit will be the responsibility of the specialist contractor, however, good practice industry procedures for careful management of the borrow pit will be adhered to.

7.2.7 Surface water collected from within the borrow pits will be channelled through the cut-off ditches within the excavation boundaries and will be directed to surface water settlement lagoons. Capacity of the lagoons will have an allowance for both settlement and flood attenuation. Surface water from the lagoons will be discharged either to the nearest watercourse or suitable soakaway in accordance with appropriate CAR registration/licence.

7.2.8 Once the required resources from the borrow pit have been extracted, the borrow pits will be restored using the overburden peat and any surplus catotelm and acrotelm peat turves from other areas within the Proposed Development. Vertical faces will not be left exposed to avoid attracting raptors to the Site.

7.3 Internal Access Tracks

7.3.1 The track layout has been developed to minimise disruption to peat, given the ecological value of the blanket bog. Changes in track orientation may be required

following detailed micro-siting surveys and efforts will be made to avoid areas of deep peat. The final location of tracks will be agreed in consultation with the ECoW to ensure regulatory distances are kept from watercourses and sensitive ecological areas.

7.3.2 The onsite access tracks will have a maximum width of 4.5m width to accommodate turbine component deliveries, with additional widening on bends as necessary. Suitable positions for passing places will be identified by the Principal Contractor and agreed with the ECoW prior to installation.

7.3.3 Site tracks will consist of one of three categories: existing tracks requiring upgrade; new tracks built with cut and fill method, and; new tracks to be 'floated' over peat.

7.3.4 The exact locations of each of these sections, along with the detailed working methodology will be described in the contractor's method statement prior to work commencing. The areas of widening, including suggested passing places along the access track to site will be agreed with the ECoW to ensure no excavation or disturbance to the existing peat, greater than is necessary.

Upgrade of Existing Tracks

7.3.5 Sections of existing tracks will require some localised widening and strengthening to facilitate access to the Site and to enable the delivery of Abnormal Indivisible Loads. Detailed assessments including swept path assessments have identified the sections that will require modifications and these have been detailed out in Appendix 18.1.

7.3.6 Existing haul roads / the restored tracks would be reshaped to take HGV transport as required, placing crushed aggregate to a depth of up to 0.4m. Geotextile membrane may also be used over sections of the access route, which would reduce the thickness of aggregate required, depending on the final design.

New Tracks

7.3.7 New access tracks will be constructed to approach the turbine locations. The track design has been developed to take account of variable peat depth and associated ground conditions and angles of slope on the site. Additional peat surveys will inform the final route of the access track to avoid areas of peat wherever possible.

7.3.8 The tracks will be constructed by first stripping the topsoil to a depth of approximately 0.3 metres and then laying a layer of sand. A geotextile membrane would then be laid on top of the sand to reduce the impact on the soils. The track would then be constructed by laying and compacting approximately 0.7m of crushed aggregate.

Wherever practical "geogrids" would also be used in order to reduce the thickness of aggregates needed. Typical access track construction is shown in Figure 3.10, however, final design details will be developed in advance of construction.

7.3.9 To ensure that the agreed route is followed during construction, the line of the track will be marked by pegs at 50m intervals on each side of the track and with ranging rods on each side at 15m intervals. No construction work or vehicles will be permitted outside the markers and no running over vegetation material or peat will be allowed prior to its excavation. The markers will be maintained by the Principal Contractor during track construction. Typically, the total working corridor for the construction of access tracks (and where relevant cable trenches) will be less than 15m.

7.3.10 Using a vibrating roller, all surfaces will be graded and rolled to a smooth, driveable surface, free of any depressions capable of holding water. Surface compression will be undertaken to the minimum extent required for adequately supporting the required vehicle weights. At all junctions, the tracks will be constructed carefully to ensure that there is no discontinuity to the running surface.

7.3.11 Through peat sections where gradients are low (of the order of 1% - 3%), any surface ponding will be controlled by establishing a shallow crossfall on the track. Seepage into the adjacent peat is preferable through the installation of cross drains under the track to ensure that these new tracks do not act as dams and prevent the movement of groundwater downslope. A series of smaller pipes/culverts will be installed at suitably close intervals and as shallow as practically possible to avoid knock on effects on the local water table.

7.3.12 Surface level cross track drainage should be installed in areas of particularly high gradient, to prevent water cascading down the track and causing loss of fines by erosion. This water will be diverted in to small track-side sediment traps –vegetated with rushes saved after necessary excavations from elsewhere on the site to help trap sediment before entering the watercourse.

7.3.13 The ECoW will ensure that the design and construction of any track drainage does not permit discharge into ecologically sensitive areas.

Cut Roads

7.3.14 In areas of shallow peat, i.e. rock head less than approximately 0.5m below ground surface, or where mineral soils are encountered, the top approx. 150mm (the amount to be determined by the vegetation, soil depth and presence of seed bank) will be

removed and then replaced over low bunds/batters formed from the side cast underlying peaty/mineral soil. The bunds/batters will be created along one side of the track on the opposite side to the cable route.

7.3.15 In areas where the peat is shallow, the road formation will generally be created by cut and fill or by a cut operation where the side slope is severe. A lateral drain will be established on the uphill side of the road to drain water from the slopes and cross drains will be established at intervals of no less than 30m to avoid these tracks acting as dams to water flow. Topsoil, and subsoil layers will be stored beside the road for use in re-instatement of road shoulders, as per best practice. Consideration should be given to the potential for entrapment of snow and water in their placement.

7.3.16 Where the access tracks are on steep side slopes with peat over 0.5m deep or where failure of the peat could result in landslip, the peat will be removed down to rock head or suitable sub-soil horizon, leaving batters on each side with angles sufficient to ensure stability of peat batter. A cut-off ditch will be established a few metres uphill of the batter to avoid significant water flow over it, thereby minimising erosion. The running surface of the road will have a cross fall in order to drain runoff into the ditches. A lateral drain will be made on the uphill side of the road with cross drainpipes at appropriate locations. The diameter of the cross drains will be calculated taking account of the catchment for each pipe. A ditch will be constructed on the lowside of the track as necessary. The outlet of the drain will be at appropriate locations, with hessian/copra mats placed at the outfalls (where appropriate) in order to minimise erosion during periods of heavy rainfall or snow melt.

Floating Roads

7.3.17 Although efforts have been made to avoid deep peat, (and any further micro-siting would still seek to achieve this objective) where tracks have to cross peat with a depth greater than 500mm to rockhead, the track will be constructed to 'float' on the in situ peat, whereby rock fill is placed on a geotextile mat laid directly onto the vegetated peat. This construction method has the intention of permitting unimpeded flow of water within the peat under the track.

7.3.18 Floating road construction essentially comprises the laying of a geotextile mat and geogrid reinforcements (a number of layers as required) across the peat and existing vegetation until a suitable bearing capacity has been reached. Where necessary, risk from runoff will be mitigated by directing drainage to settlement areas in locations agreed with the ECoW.

Surface Treatment

7.3.19 Both floated and 'cut and fill' tracks will be finished with a running surface of higher quality, finer graded, free draining crushed stone, prior to turbine delivery. The stone used would be of similar chemical composition to that occurring naturally on the site as it would be sourced from borrow pits within the Site, so the pH and minerals released would not affect adjacent vegetation. Using a vibrating roller, all surfaces will be graded and rolled to a smooth, easily driveable surface, free of any depressions capable of holding water. Surface compression will be undertaken to the minimum extent required for adequately supporting the required vehicle weights. At all junctions, the tracks will be constructed carefully to ensure that there is no discontinuity to the running surface.

7.4 Watercourse Crossings & Road Construction near Watercourses

7.4.1 Access tracks will be installed such that they are not a barrier to natural surface water or groundwater pathways and such that the tracks themselves do not become a conduit for flow.

7.4.2 The turbine and road layout has been designed to minimise the number of watercourse crossings and five major watercourse crossings and one minor mapped watercourse crossings[1] are required. A watercourse crossings assessment has been carried out and is covered in Appendix 3.1 of the ES. All watercourse crossings will be constructed in line with the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR).

7.4.3 In addition to the watercourse crossings identified, it was noted during the site walkover survey that numerous un-mapped watercourses cross the proposed access route. These are minor in size with small catchments and are mainly drain routes from the areas of peat. When necessary these water courses would be culverted using a 450mm diameter concrete pipe as a minimum to prevent and reduce the risk of blockage. Details of these water crossings and proposed culverts are provided in Appendix 3.1.

7.4.4 Environmental protection measures will be incorporated into the design and construction of the watercourse crossings to minimise soil erosion. The Principal Contractor will:

[1] Any crossing on a watercourse shown on the 1: 250,000 scale OS map has been classified as a major crossing and crossings on any other watercourses have been classified as minor watercourse crossing.

- Submit site specific method statements in accordance with the CEMP and the guidance documents, to the Applicant and the ECoW, prior to works commencing;
- Ensure the following measures are adhered to (measures will not be limited to these and works will be conducted in accordance with above guidance):
    - watercourse crossing materials and infrastructure will be non-erodible and benign to aquatic life;
    - the use of mechanical equipment will be kept to a minimum and soil stabilisation practices will be employed where soil or peat exposure is necessary;
    - machines will not operate from the streambed or excavate the bed;
    - operations will be carried out in dry weather and periods of low-flow rate where possible and not directly after heavy rainfall;
    - where sediment transport is identified as a potential impact from a particular activity at the Site, sediment traps will be installed and provision made to maintaining them. Cleaning and maintenance of sediment traps will be undertaken in low flow conditions and in dry weather;
    - temporary peat storage areas (as required) will be constructed at a safe distance from watercourses (minimum of 10m);
    - erosion at end of drain culverts will be avoided by reinforcing the substrate and reducing flow velocities, e.g. placement of stone rip rap or gabion baskets filled with local stone, or creation of small plunge pools;
    - culverts will be set to maintain the hydrological gradient across the tracks, with no change in base level;
    - the stream floor will be maintained within the culvert.

Watercourse Crossings Types

7.4.5 Figures 3.13, 3.14 and 3.15 of the Environmental Statement show the location and indicative watercourse crossings design drawings. The design selected will be dependent upon the specific site location and nature of the watercourse at these locations. Where bridging is unsuitable, the box-culvert would be used to ensure a naturalised stream floor and provide mammal passage, rather than a circular culvert.

7.4.6 The mammal passage could also act as a high flow relief if necessary, but should be located above the water level during the majority of floods. A management plan for

the monitoring of sediment traps, drainage and culverts will be designed in agreement with the SEPA.

7.5 Cabling

7.5.1 Each wind turbine will be connected to the sub-station / control building via underground cabling. The power cables will run beneath the ground surface, between the turbine site and the substation and will be laid in a trenching operation covering typically 250m lengths at a time. Cable run installation will be undertaken where possible immediately adjacent to and within the on-site access track construction zone, to minimise intrusion into the peat area. The depth and width of the trenches will be dependent upon the number of cables to be laid but would be a maximum of 4 metres wide and 1 metre deep.

7.5.2 Once on site, a suitable method of cable-laying will be devised using geotextiles to assist trench stability if necessary. Every effort will be made to meet an operational target for reinstatement of trenches within 14 days. Any open cable trenches will be ramped at the end of each working day to avoid mammals or any protected species becoming trapped.

7.5.3 Clay bunds will be placed within longer sections of cable trench so as to prevent trenches from acting as preferential drainage channels. The location and frequency of these bunds will be agreed with the ECoW as considered appropriate to the location (e.g. dependent upon trench longitudinal gradient).

7.5.4 The position of the trench will be marked out and the vegetation and 200-300mm of soil will be removed as whole turves. The depth will vary across the Site dependent on the vegetation and soils and the depth in any area will be advised by the ECoW. Where possible, the turves would be cut to the width of the trench and placed on geotextile parallel to the trench. Where such turf lifting is not possible owing to the skeletal nature of the peat, the vegetation and peat would be scraped off and placed to one side for subsequent reinstatement after the cable has been laid. The majority of cable run installation will be undertaken adjacent to and within the track construction zone, to minimise intrusion into the surrounding areas. Where topography or ecological constraints dictate (over limited sections), the cables will be installed in ducts within the existing track corridor.

7.5.5 After topsoil turf removal, any further subsoil or peat would be excavated and placed separately from the vegetation where these occur. Any rock or other mineral material

below the soils would then be segregated from the removed subsoil and used elsewhere for restoration or construction.

7.5.6 Cable depth may vary between 700mm and 1200mm and cables will be surrounded in 300mm of sand or quarry dust, with excavated peat backcast into the trench. There would be a minimum separation of 500mm between the surface and the sand bed. Trench dimensions will be dependent on the number and capacity of the cable contained within.

7.5.7 Where cables cross open gullies they will be installed in split ducts 1000mm below invert. During installation operations these will be temporarily dammed and a straw bale filter or silt-trap placed downstream to avoid pollution of the downstream watercourse by suspended solids. The used bales will then be disposed of offsite to an approved waste disposal point.

7.5.8 On completion of cable laying the route will be marked at all direction changes, stream crossing points and at 150m intervals.

7.5.9 Following testing, the trench will be backfilled and compacted in layers with suitable material and reinstated with previously excavated surface soils (from which stones will have been removed). Sand will be imported to Site and will be placed around the cables as protection except where these are bedded in peat. Suitable duct marker tape will be installed in the trench prior to backfilling. All backfilling and re-instatement will be completed within a target of 14 days of the opening of the trench (weather permitting).

7.5.10 The acrotelm layer and underlying peat will be replaced using an excavator in the correct order to reflect their original layers as carefully as possible in order to achieve an acceptable recovery of the disturbed ground. Peat would be filled around any loose or exposed vegetation where turves were used to prevent erosion. The subsoils and peat would be gently compressed but not compacted. The finished level will be left proud by 150mm if necessary to allow for settlement of the trench. All backfilling and re-instatement will be completed within a target of 14 days of the initial excavations, weather permitting. Backfilling will take place progressively in lengths between the turbine bases. A normal rate of cable installation from excavation to backfilling is three days for each 250m length. As such, the vegetation and soil / peat will only be stored for a matter of a few days prior to backfilling.

7.6 Drainage Design

7.6.1 Drainage design will be in accordance with good practice guidance and the proposed works will aim to mimic the existing regime as closely as possible.

7.6.2 In vulnerable areas pre-earthworks drainage will be installed to intercept runoff before it reaches any of the new access tracks, constructions areas and borrow pits. This will minimise any runoff, which could lead to increased suspended solids entering adjacent watercourses.

7.6.3 In low lying wet areas, new drainage will be omitted to avoid drying out these areas.

7.6.4 Generally new access tracks will be raised above existing ground levels with a slight cross-fall to avoid the tracks becoming a conduit for surface water flows (which could lead to erosion and increased runoff of suspended solids). Undertrack drainage will be installed to ensure that the new tracks remain drained and the structural integrity remains intact. Where required, cross drains will be installed to intercept runoff and transfer it to new drainage ditches along the verge of the new tracks.

7.6.5 The Principal Contractor will ensure that the dewatering water or surface runoff is not discharged directly into a watercourse, surface water drain or wetland area and ensure that appropriate settlement and filtration systems are in place. This could involve the installation of silt traps, silt fencing, straw bales, settlement lagoons or a combination of the above.

7.6.6 If the runoff water or dewatering water contains elevated concentrations of contaminants, the water will be appropriately treated prior to discharge to a watercourse such that Environmental Quality Standards within the watercourse are not exceeded as a result of the discharge.

7.7 Wind Turbine Foundations

7.7.1 The locations for the turbines are subject to a micro-siting allowance (to be agreed), provided that the amended position is more than 50m from a watercourse. The final location will be agreed in consultation with the ECoW.

7.7.2 The location of the working area for each base will be proposed by the Principal Contractor following any micro-siting activities and then agreed with the ECoW and demarcated using pegs prior to any excavation being undertaken. The working area around each turbine will be required to accommodate the turbine bases, material storage, crane hard standing and construction activity. The works will minimise the footprint of all excavations and the duration for which excavations are left open. The

purpose of this is to minimise the impact on underlying perched waters and site reinstatement.

7.7.3 Cut-off ditches at the perimeter of foundation excavations will be put in place only where necessary depending on the local topography to divert the clean water away from the work areas, reducing the volume of water potentially requiring pumping / treatment in silt traps / settlement lagoons. It is not anticipated that large scale dewatering will be required during the excavations. Water from dewatering of excavations will be pumped via surface silt traps to ensure that sediment does not enter surrounding watercourses. Settlement lagoons will be employed in areas where the level of runoff is likely to exceed levels normally contained within a silt trap and if required shall be approved by the ECoW.

7.7.4 In order to prevent stock ingress into turbine excavations, temporary fencing will be erected around deep excavations when construction works are not ongoing (i.e. after working hours and at weekends). The principal contractor will be responsible for insuring no unauthorised access can be gained to deep excavations.

7.7.5 If peat depths greater than 2m are encountered at turbine locations, the method of excavation to formation level will be by the creation of rock cofferdams in order to minimise the area of excavation. If deep peat is exposed at the edge of the excavation there is a danger it will collapse into the deep excavation. To avoid this, the vegetation and rooting zone will be removed as whole turves and stored nearby for replacement after construction or used elsewhere. Following this a 360° excavator will be used to cut a narrow trench around the edge of the wind turbine base. This will be backfilled with large local stone. Peat will be removed from the area within the trench and used in restoration works. The stone in the trench will form a rock buttress (35° - 37°) resting against the vertical peat edge to prevent erosion and the possibility of collapse.

7.7.6 The ready mixed concrete will be delivered to the turbine location by mixer wagon and placed using either a pump or by crane and skip method. Exact volumes of concrete will depend on the foundation solution. The concrete will be poured in even layers and compacted with the use of air pokers and levelled using tamps. Curing methods to suit weather conditions will be employed as necessary. A concrete pedestal will be cast on top of the foundation, onto which the turbine tower will later be bolted and the excavated area will be back-filled.

7.7.7 Excess concrete will be returned to the plant for suitable disposal and care taken to ensure that alkaline concrete washings do not contaminate the areas surrounding the

base. The material from the washout area located in construction compound will be disposed of appropriately offsite.

7.7.8 Once the concrete has cured, the base shutters will be stripped and used shutters and surplus materials removed from the area, re-used at the next wind turbine location, and ultimately disposed to a licensed landfill facility.

7.7.9 Backfilling of the foundation will involve replacement of previously excavated material to reflect the peat/glacial till structure prior to excavation. After which peat will be replaced from storage and compressed but not compacted. These layers would be built up until the topsoil level of the original ground surface level is reached. Vegetated material (peat – based turves retained for this purpose) would be replaced neatly on top to seal the peat.

7.7.10 All the bases will be fully restored by the end of the construction phase, leaving a path around the plinth for service personnel.

7.8 Hardstanding areas

7.8.1 The exact location and orientation of the hardstanding areas will be optimised to make best use of the existing topography, prevailing wind conditions (to enable safe lifting) and chosen erection procedure. Where ecological or other constraints have been identified within the vicinity of a turbine, the crane padwill be orientated to avoid these constraints, where possible.

7.8.2 Turf and peat will be removed wherever possible and stored adjacent to the area.The area will be set out to the required dimensions and excavated to a suitable formation (dimensions to be determined once the turbine supplier has been appointed). The hardstanding will be designed to support cranes and wind turbines components as shown on Figure 3.5 of the ES.

7.8.3 Coarse rock fill will then be placed and compacted in layers using compaction equipment. Geotextile matting, to facilitate better distribution of weight, may be used depending on the suitability of the underlying strata. The final surface will be formed from selected granular material and trimmed to allow surface water runoff to drainage ditches.

7.8.4 Hardstanding areas will remain in-situ for the operational life of the wind farm.Once the hardstanding areas have been formed, material and vegetation would be placed around its edges to tie it back into the surrounding environment. The stored peat

would be used to fill in and form the slope to connect the edge of the pad with the surrounding peat faces and then thatched with the vegetated turves.

7.8.5 Vegetation monitoring will be carried out by the ECoW during the operational phase of the wind farm and if required suitable sourced seed mix would be deployed.

7.9 Substation Construction

7.9.1 The substation building compound would be located at the cable exit from the Proposed Development. This will comprise a control building and hard surfacing for vehicle parking and should be constructed in accordance with local building standards.

7.9.2 The building will include switch gear foundations and cable housings, as well house welfare room and facilities, site communications, office and storage area. Foul drainage from the control building will be disposed of to a septic tank which will be regularly empties by an approved contractor.

7.9.3 Finishing materials are to be locally sourced if possible. Internally the structure will be finished with concrete/plaster.

7.10 Anemometry Mast

7.10.1 A permanent anemometry mast will be installed to gather wind data and monitor the performance of the wind farm. The mast will be located to the east of Turbine 4 (refer Figure 3.1) and will have a maximum height of 90m as shown in Figure 3.8.

7.10.2 The mast will require a concrete foundation and will be erected using a small crane. Access to the met mast will be along a 270m track connected to the main network of Site tracks. The ground disturbed for the mast will be reinstated at the end of construction in accordance with this CEMP and with the Contractor's Method Statements.

7.11 Radio Communications Tower

7.11.1 A radio communications tower will be erected on behalf of Airwave Solutions Ltd in order to mitigate potential effects during the operation life of the wind farm on its service. An outline design of the tower is included in Figure 3.9 of the ES.

7.11.2 Maximum height of the lattice tower will be 20m and the installation will require a concrete foundation. Erection of the tower will be achieved using a small crane. Access to the tower will be along a 790m track connected to the main network of site tracks.

Assembly of Wind Turbines

7.11.3 Main components of the wind turbines such as tower, blades and nacelle, will be delivered to their respective turbine location via the access tracks. For the erection of the wind turbines, lattice mast or telescopic cranes will be used in the necessary configuration depending on the available crane technology.

7.11.4 The areas to be cleared of any obstacles (refer Figure 3.5 of the ES) would be levelled to ensure easy walking access to components. The tower sections will be erected from laydown areas adjacent to each foundation onto the foundation bolts. The HGVs and cranes will operate from the hardstanding areas to assembly the turbine sections. The foundations and power cable duct will be constructed in such a way that the wind turbine doors will be directly facing the hardstanding area.

7.11.5 The nacelle will be unloaded from its trailer and placed adjacent to the base within the base working area prior to erection on the tower using the crane. Upon delivery, the blades will be fitted onto the rotor. The rotor assembly will be lifted onto the previously erected nacelle by crane. It is anticipated that the installation of each turbine will take two lifting days in good weather.

8 RESTORATION AND AFTERCARE

8.1 Restoration

8.1.1 This section deals primarily with the restoration of the Site immediately following construction activity. It is separate to the commitment of the Applicant to restore a significant area of the peat moorland to the benefit of biodiversity. The Outline Habitat Management Plan should be referred to for details of the wider restoration works proposed within the Proposed Development.

8.1.2 Vegetation monitoring will be carried out under the guidance of the ECoW during the operational phase of the wind farm. Post-construction vegetation surveys will be undertaken to monitor the success of reinstatement. In areas where it is considered that natural re-vegetation from the seed bank is unlikely to occur, the ECoW will suggest a suitable seed source and methods for reseeding which will be subject to approval by, SNH, SEPA and the Shetland Islands Council.

8.1.3 All restoration activities will be overseen by the ECoW to ensure methods are properly adhered to. This is important to ensure peat turves and stripped topsoils with seed banks and vegetative fragments are not kept out of the ground for too long and their value for restoration lost.

Access Tracks

8.1.4 Access tracks will be retained post construction to allow for access during the operational phase.

Site Compound

8.1.5 There are no ecological issues associated with re-vegetation of any areas disturbed by construction of the Site compound. The area surrounding the Site compound location will be fully restored in accordance with the procedures outlined above and best practice.

Cables

8.1.6 The majority of the cable trenches will be constructed at the track edges and will therefore be incorporated into the restoration of the batters. For the small sections of cable to be installed away from the tracks, the trench construction and backfilling method employed on Site will ensure that the vegetation will recover without the requirement for additional treatment.

Turbine Foundations and Crane Pads

8.1.7 It is anticipated that crane pads be retained at their constructed size post-construction for operational and maintenance purposes. Any peat removed during construction of the crane pads will either be relocated to the nearest restoration area, used sympathetically to reinstate around the turbine foundations in consultation with the ECoW , or stored for relocation as soon as is practicable in-line with the Outline Peat Management Plan.

Substation

8.1.8 There are no ecological issues associated with re-vegetation of any areas disturbed by construction of the substation. The area surrounding the substation location will be fully restored in accordance with the procedures outlined above and best practice.

8.2 Aftercare

8.2.1 For all reinstated areas associated with construction, immediate aftercare provision will include an inspection of reinstated areas after completion of the reinstatement work at each location. It is proposed that an annual monitoring programme will be undertaken for five years in accordance with the OHMP.

8.2.2 In addition, the Applicant will arrange regular maintenance visits to the Site and will visually monitor the success of re-vegetation. In cases where re-vegetation is not as

successful as required, advice will be sought from the ECoW / SNH on necessary remedial action. For information on post-construction restoration monitoring, refer to the OHMP.

9 REVIEW OF THE CEMP

9.1.1 As this document is an outline CEMP its content will be reviewed, updated and elaborated upon once the consent has been granted for the Proposed Development. At this point, the OCEMP should be reviewed, particularly in relation to any planning conditions that need to be met / discharged.

9.1.2 Once the Principal Contractor has been appointed, detailed design, construction methods and programming to be applied to the scheme will be completed and incorporated to the detailed CEMP. The requirements set out within the ES and any further deemed planning conditions will be incorporated at this time, with the document being developed further rather than any significant deletions being made. Where actions have been completed (e.g. a planning condition discharged), this should be referenced.

9.1.3 The Principal Contractor will be responsible for ensuring effective communication on Site within the project team throughout the duration of the project, to ensure all site personnel are aware of the key issues of the CEMP. The Principal Contractor will also develop a procedure for logging and dealing with complaints and reporting of non-conformance issues.

9.1.4 The construction of the Proposed Development will take 24 months approximately, commencing in 2018. During this time, the document will be updated as required by the Applicant.

[i] Scottish Renewables, Scottish Natural Heritage, Scottish Environment Protection Agency, Forestry Commission Scotland - Version 1, October 2010 available at: whihttp://www.snh.org.uk/pdfs/strategy/renewables/Good%20practice%20during%20windfarm%20construction.pd (accessed: 28/01/2016).
[ii] RenewableUK "Wind Turbine Safety Rules", Third Edition, 2015, Issue 1
[iii] 'Guidance on the classification and assessment of waste Technical Guidance WM3' published by SEPA (2015)
[iv] http://www.snh.gov.uk/docs/A514967.pdf

Wardell Armstrong LLP
City Quadrant, 11 Waterloo Square, Newcastle upon Tyne, NE1 4DP, United Kingdom
Telephone: +44 (0)191 232 0943 Facsimile: +44 (0)191 261 1572 www.wardell-armstrong.com

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PEEL WIND FARMS (YELL) LIMITED

Beaw Field Wind Farm

Outline Peat Reinstatement and Management Plan, Annex 1

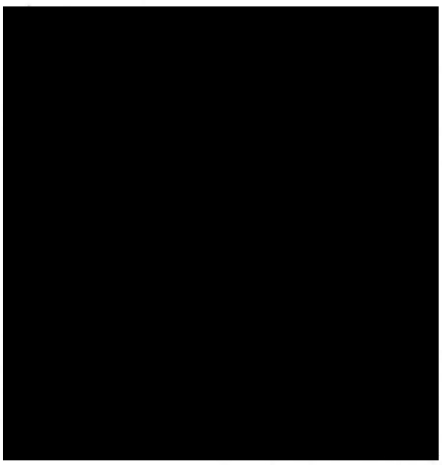
February 2016

PREPARED BY:

Anna Basley Soil Scientist

APPROVED BY:

David Brignall Regional Director



ENERGY AND CLIMATE CHANGE
ENVIRONMENT AND SUSTAINABILITY
INFRASTRUCTURE AND UTILITIES
LAND AND PROPERTY
MINING AND MINERAL PROCESSING
MINERAL ESTATES AND QUARRYING
WASTE RESOURCE MANAGEMENT

CONTENTS

1 INTRODUCTION

1.1 Role of Outline Peat Reinstatement and Management Plan

1.1.1 This Outline Peat Restoration and Management Plan (OPRMP) has been prepared alongside the Environmental Statement (ES) for the planning application for Beaw Field Wind Farm ('the Proposed Development').

1.1.2 This is an outline document to be further developed subsequent to the Proposed Development receiving consent and deemed planning permission. Specific details and plans will be determined following detailed ground investigations (GI) post-consent, which will be included in a full PRMP as part of the appointed Principal Contractor's detailed Construction Environmental Management Plan (CEMP). An Outline CEMP (OCEMP) is provided at Appendix 3.6 of the ES. The GI will include detailed characterisation of the peat deposits present in places of excavation, including, but not limited to: the depth of the acrotelm layer, the level of composition, moisture content, consistence and structure.

1.1.3 The GI will also provide necessary information to manage peat landslide risk, as identified in Appendix 12.2: Peat Slide Risk Assessment. In particular the GI findings will be used to update, review and expand as necessary the Geotechnical Risk Register. The PRMP will incorporate the Geotechnical Risk Register, included in Appendix 12.2, which describes peat stability aspects for each project component and includes control measures to be employed during construction.

1.2 Objectives

1.2.1 The overall aim of this PRMP is to demonstrate appropriate management of peat during the construction phase of the Proposed Development.

1.2.2 The procedures defined should be followed in combination with a detailed Habitat Management Plan (HMP). A final HMP to assist longer-term management and restoration measures will be provided on receiving planning consent. An Outline HMP (OHMP) is provided in Appendix 10.4 of this ES.

1.3 Policy and Guidance for Peat Management

1.3.1 This PRMP has been compiled with regard to the following best practice guidance:

- Guidance on Developments on Peatland: Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and Minimisation of Waste (SEPA and Scottish Renewables, 2012[i]);
- Developments on Peatland: Site Survey and Best Practice (Scottish Natural Heritage, SEPA, Scottish Government and The James Hutton Institute, 2011[ii]); and
- Good Practice during Wind Farm Construction (Scottish Renewables, Scottish Natural Heritage, SEPA and Forestry Commission Scotland, 2nd Edition, 2013[iii]).

2 PEAT CONDITIONS ON SITE

2.1 Definition of Peat

2.1.1 Peat is defined as the partially decomposed remains of plants and soil organisms which have accumulated at the surface of the soil profile. Peat accumulates where the rate of input of organic material from the surface exceeds the rate of decomposition and 'turn-over' of this new material[iv].

2.1.2 The acrotelm is the upper aerobic layer of peat and consists of living and partially decayed plant material. It typically has a higher hydraulic conductivity and is defined in relation to distance to the water table. Acrotelm thickness can vary with the topography. The catotelm layer sits under the acrotelm, consists of highly decayed material, and is significantly denser, with low hydraulic conductivity.

2.2 Sources of information

2.2.1 Following the desk based study, Blairbeg Consulting Ltd carried out a preliminary peat survey, see Appendix 12.1 of this ES. Peat depths were recorded on a 250m grid with notes about the nature and condition of the peatland habitat.

2.2.2 An additional survey was carried out to inform preparation of the final layout of all associated infrastructure. This survey recorded peat depths on a 50m and 100m grid. A total of 1,762 sample points defining peat depth were recorded. The peat depths ranged from between 0m (peat absent) to a maximum of 4.35m, with an average depth of 1.25m. For further details, see Appendix 12.1.

2.2.3 The condition of peat within the Site was described as extensively degraded, caused by anthropogenic activities such as over grazing, (Photograph 1), and peat cutting, see Appendix 12.1. Erosion was evident across the Site in the form of hags and gullies (Figure 12.3).

Photograph 1: Overgrazing has resulted in areas of exposed and degraded peatland habitat

2.2.4 A full and detailed description of the peat condition with the Site is presented in Chapter 12: Soils and Peat of this ES.

3 AVOIDANCE, MINIMISATION, HANDLING AND REINSTATEMENT

3.1 Introduction

3.1.1 The OPRMP has been developed as part of an iterative design process in order to prevent unnecessary excavation or disturbance of peat. Further details of the design process are presented in Chapter 5: Design Evolution and Alternatives of the ES.

3.2 Further minimisation before and during the construction phase

3.2.1 The disturbance of peat resulting from the construction of access tracks, borrow pits, turbine foundations, temporary site compound and substation will be minimised as practically possible.

3.2.2 The Principal Contractor will implement measures to minimise the volumes of excavated peat. Appropriate handling, storage and management of peat will be undertaken to ensure the integrity of the material.

3.2.3 An Ecological Clerk of Works (ECoW) will be appointed prior to each phase (GI, preliminary works and main works) of the construction process. Their role will be to undertake Site walkovers with engineers and contractors to identify areas of sensitivity, highlighting where impact can be reduced by minor movement within the micro siting available.

3.2.4 All method statements and plans will be accompanied by justification of the final design or construction methods identified by the Principal Contractor.

3.2.5 The Principal Contractor will be required to ensure excavated peat is reused onsite, subject to the condition and method of reinstatement.

4 PEAT BALANCE

4.1 Excavation and Reinstatement Volumes

4.1.1 Peat excavation volumes have been calculated based on the following data and assumptions:

- 5m LIDAR Digital Terrain Model;
- Peat depths provided by surveys conducted by Blairbeg Associates Ltd (see Chapter 12);

- An assumption that the probe depth is representative of the actual peat depth; and

4.1.2 At this stage, based upon the approximate volume of peat to be excavated, it is calculated that all excavated peat can be reused onsite. **Error! Reference source not found.** summarises the excavation and reinstatement volumes that have been calculated for each project component.

Table 1: Indicative Peat Balance

Project Component	Phase (months)	Excavated volume of peat (m^3)	Reinstated Area (m^2)	Reinstated Depth (m)	Reinstated Acrotelm (m^3)	Reinstated Catotelm (m^3)	Reinstated Total (m^3)	Balance ($m^{3)}$
Acces Track verges	0-24	82170	12,581	0.3	3774	0	**3774**	78,396
Turbine bases and hardstanding perimeter	9-24	89170	9214	0.3	2764	0	**2764.2**	86,406
Anemometry mast	0-24	120	78	1.5	23	97	**120**	0
Radio tower	0-24	9	30	0.3	9	0	**9**	0
BP1	0-6	5590	14,790	2	4437	25143	**29580**	-23,990
BP2	0-12	26390	27,670	2.5	8301	60874	**69175**	-42,785
BP3	0-24	35730	23,410	3.5	7023	74912	**81935**	-46,205
BP4	9-24	8130	17,930	2	5379	30481	**35860**	-27,730
Compound during construction	3-24	3810	3835	1	1151	2685	**3835**	-25
Substation	3-24	1380	320	0.3	96	0	**96**	1,284
Ditch/gully blocking	0-24	0	300	1.5	90	360	**450**	-450
Targeted infilling	0-24	0	17000	1.5	5100	20400	**25500**	-25,500
Total		**252,486**	**127158**	-	**38147**	**214951**	**253099**	-613

4.2 Turbine Foundations and Hardstanding areas

4.2.1 During turbine and hardstanding construction, peat will be excavated to the substrate for the concrete base, plus an area for the overall foundation footprint. The initial excavation be 17m diameter (see Figure 3.4 for a typical foundation design and Figure 3.5 for a typical hardstanding area).

4.2.2 A total of 89,170m^3 of peat is expected to be excavated for turbine bases. Excavated peat (acrotelm turves only) will be used to reinstate the turbine bases (with an approximate total of 2,764m^3).

4.2.3 Ground disturbance areas around excavations would be kept to a minimum and would be clearly defined. Access to working areas during construction would be restricted to specific routes.

4.3 Site Compound and Substation

4.3.1 The Site compound is located in a large area of shallow peat (<0.5m) and bare ground caused primarily by high grazing intensity (see Figures 12.4 and 12.5). The construction area is 7,670m^2 with an approximate associated volume of peat excavation of 3,810m^3. Once the Proposed Development is operational, this area can be reduced in size and peat can be reinstated here, including the adjacent area that is eroded. The expected volume of reinstatement is 3,835m^3.

4.3.2 Internal bunds can be created using mineral soil to allow for an average depth of 1m. The areas between bunds can be laid with catotelm with acrotelm turves placed on top (for further details see Paragraph 5.5.20).

4.3.3 The substation is located in an area of degraded peat with hags and erosion present (Figure 12.3). The construction area is 1,520m^2 with an approximate volume of excavation of 1,380m^3. The perimeter of the substation will be reinstated using approximately 96m^3.

4.4 Access Tracks

Cut and Fill Tracks

4.4.1 The Proposed Development requires 11.1km of access tracks consisting of 10,484m^2 surface area with an approximate volume of 82,170m^3 and a reinstatement area of 12,581m^2. The volume is calculated on the basis that only cut and fill tracks would be required. Final track design will be confirmed upon results of the detailed GI. A reinstatement volume of acrotelm turves has been calculated at 3,774m^3 to be used for reinstatement of access track verges.

Floating Roads

4.4.2 Lengths of track that have been identified as suitable for a floating road are presented in Figure 12.2. If employed, the volume of peat excavated for access tracks including floating road sections would reduce from 82,170m^3 to 76,000m^3.

4.5 Borrow Pits

4.5.1 Borrow pit reinstatement for each individual borrow pit using excavated peat will depend upon final borrow pit design (design will be finalised based on the findings of detailed GI). These details will be included in the final PRMP (See paragraphs 5.4.19-22 for individual borrow pit reinstatement.

4.6 Cable Tranches

4.6.1 Cable trenches will run parallel to the access track edges to minimise intrusion into peat. The excavation of peat for the trenches will be undertaken from the access track, ensuring no vehicle movement on the vegetated areas adjacent to tracks. The space taken by the cables would be small and it is expected that all excavated peat will be reinstated in situ.

5 EXCAVATION, STORAGE, RE-USE AND REINSTATEMENT

5.1 Excavation

5.1.1 Prior to any excavations, the Principal Contractor will produce a detailed Method Statement identifying where and how excavated peat will be used in reinstatement works. Requirements for the excavation, handling, storage and reinstatement of peat are outlined in this PRMP below.

5.1.2 Areas of peat within the development footprint will have the top layer of vegetation (acrotelm) stripped off as turves (approximately 200-300mm thick depending on maximum rooting depth) by an experienced specialist contractor using a low pressure, long-reach 360^{o} excavator (or similar).

5.1.3 Underlying catotelmic peat will be removed and stored separately to avoid cross contamination between the distinct horizons.

5.1.4 Classification of excavated materials will depend on their re-use in reinstatement works. Within the Site, the material excavated is likely to comprise of peat (possibly sub-divided into amorphous peat, fibrous peat and turf) and mineral sub-soil.

5.2 Temporary Storage

5.2.1 Excavated peat will need to be stored on site. Temporary storage of peat will be required to hold excess peat that will be used for reinstatement. Storage locations would be agreed with the ECoW prior to the commencement of the construction phase and provided with a location plan to accompany the PRMP and relevant method statement.

5.2.2 When storing peat, the peat profile will be maintained. Peat stores will be bunded using impermeable material (most likely soils sourced from non-peat soil turbine excavations). The bunds will extend to a level above the toe of the stockpiled material to provide restraint to surface run-off.

5.2.3 Temporary storage areas required for peat will be identified in the Principal Contractor's Construction Method Statement (CMS). This will describe any intended drainage, pollution prevention and material stability mitigation measures that may be required.

5.2.4 The design and location of stockpiles, including incorporated drainage elements, will be agreed with the ECoW and Geotechnical Consultant and included on the detailed construction drawings for each turbine.

5.2.5 Stockpiles are not to be stored within 70m of any watercourse unless otherwise agreed with the ECoW. This will ensure that any wetting required on stored peat does not runoff and discharge into adjacent watercourses. Suitable storage areas are more appropriately sited in areas with lower ecological value and low gradient slopes.

5.2.6 Any edges of cut peat that may remain exposed, or areas of peat excavation on steep slopes, will be covered with geotextile or similar approved techniques. This will allow re-turfing and re-vegetation and reduce erosion risks

5.2.7 Haul distances of excavated peat will be kept as short as possible and as close to intended re-use destinations to minimise the potential impact on the peat structure. It is important that temporary storage is safe and keeps the material suitable for its planned reuse.

5.2.8 The handling and storage of peat will seek to ensure that excavated peat does not lose either its structure or moisture content. Peat turves require particularly careful storage and wetting and to be maintained to prevent drying out and subsequent oxidisation to ensure that they remain fit for re-use.

5.2.9 Transport of peat to temporary storage areas, restoration areas or designated spoil areas will be by low ground pressure vehicles to avoid excessive compaction of the peat.

5.3 Bare Peat

5.3.1 The duration when bare peat surfaces are exposed will be minimised. The phasing of work will be carried out so as to reduce the amount of total exposed ground at any one time. By stripping turf and replacing as soon as possible after peat has been re-distributed there will be minimal areas of bare peat.

5.3.2 Any areas of bare peat, where vegetation is not re-growing, will be seeded with a seed mixture obtained from the existing habitat or covered with acrotelm turves. Areas where full recovery is complete will have temporary fences removed.

5.3.3 This approach has been shown to work on other peat sites and the turves re-grow quickly both establishing vegetation and consolidating the peat. The re-vegetated areas will be monitored. Any areas of bare peat, where vegetation is not re-growing, will be seeded with a seed mixture obtained from the existing habitats on site.

5.4 Infrastructure Reuse

5.4.1 The Principal Contractor will be required to provide appropriate plant for undertaking all reinstatement works such that unnecessary disturbance of the ground surface occurs. In order to minimise damage to the ground surface, mobile plant required for reinstatement and landscaping works will be positioned on constructed access tracks, hardstanding areas or existing disturbed areas wherever possible. The use of a low pressure, long reach 360^{o} excavator for excavations and reinstatement works is preferable as it enables sufficient room to allow initial side casting and subsequent pulling back of turves over reinstated peat. Bog mats will also be used to undertake restoration of degraded peat if the maximum extent of the long reach arm has been met.

5.4.2 Reinstatement of vegetation will be focused on natural regeneration utilising peat vegetated turves. To encourage stabilisation and early establishment of vegetation cover, where available, peat turves or other topsoil and vegetation turves in keeping with the surrounding vegetation type will be used to provide a dressing for the final surface.

5.4.3 Consideration will also be given to the impacts of poor drainage control in any areas where peat is used in reinstatement, for instance, track verges and reinstatement of construction compounds.

5.4.4 Particular attention will be paid to maintaining hydrological continuity and preventing the creation of preferential subsurface flow paths (for instance within backfilled cable trenches).

5.4.5 Any surplus peat will placed in areas identified by the geotechnical clerk of works in conjunction with the ecological clerk of works as suitable.

Cut and Fill Access Tracks

5.4.6 When constructing tracks rapid restoration of track verges will be undertaken as track construction progresses. Immediately following construction, some turves will be replaced along the road edges to allow quicker re-vegetation and soften visual landscaping of the road edges.

5.4.7 Excavated peat from cut and fill sections of access tracks will be used for dressing the side slopes of track sections. Only peat turf and fibrous peat is likely to be suitable for battering road verges.

5.4.8 Track edges and passing places would be reinstated post construction through the removal of capping material and the reuse of peat turves. Where peat turves are used to reinstate track edges this will be done in a manner to ensure works tie in with the surrounding topography, landscape and ground conditions.

5.4.9 The design and construction of tracks on peat will be done in such a way to reduce impacts on and maintain the existing peat hydrology at the site. The built track will allow for the transmittance of water, so natural drainage can be maintained as much as possible.

5.4.10 Care will be taken when forming and landscaping verges with peat so to over-deposit. Therefore, low verges will be used for track verges to allow any surface water to drain naturally, where it arises.

5.4.11 It is estimated that 82,170m^3 of peat will be excavated during construction of the tracks. As the area of excavation will be wider than the tracks running surface and the fill, some of the peat will be reinstated in situ. It is estimated that, on average, it will be 2m wide strip of land each side of the track (see Figure 3.10). The acrotelm turves, from the 0.3m top layer, will be used for that purpose. It is estimated that the reinstatement area will be 1.3ha in total and that 3,774m^3 of acrotelm peat will be used. Some catotelm may be reused as well, but only if the void created next to the track allows for that and it was present there before the excavation.

5.4.12 The reinstatement will be carried out progressively so that the storage time is minimal (it should not exceed 6 weeks). This will take place everywhere where the cut tracks pass through peat. The peat displaced by the track fill material will be used in the restoration of the borrow pits. See Photograph 2 for an example of the difference between poor and good practice.

Photograph 2: (Right) Poor reinstatement of peat at road verges. No peat turves have been used allowing the material to dry out and crack providing no ecological benefit. (Left) In comparison, peat turves have been used providing an ecological benefit. (Photo credit: SNH, SEPA, FCS and Scottish Renewables, 2010iii)

Turbine Foundations and Hardstandings

5.4.13 Peat will be replaced around the turbine base excavations, and re-turfed with acrotelm. Peat will be placed into any areas disturbed by the construction activities, around the crane hardstandings, rotor assembly hardstandings and other areas used in the construction phase.

5.4.14 It is envisaged that the majority of the excavated peat materials will be reused for the purpose of borrow pit restoration (see Paragraph 5.5.15-22), with surplus peat used for infilling and reinstatement (see Paragraph 5.5.1).

Borrow Pits

5.4.15 Borrow pit reinstatement for each individual borrow pit using excavated peat will be confirmed upon results of the detailed GI. These details will be included in the final PRMP.

5.4.16 Borrow pit design will take account of medium and long-term restoration objectives relating to habitat and environment. In particular, they will be designed such that water levels within the restored habitat can be maintained at ground level, to allow waterlogged conditions to be maintained. This can be achieved by excavating the borrow pits downslope where possible, allowing the downslope worked face to retain high water levels within the restored area thus preventing peat drying out.

5.4.17 Catotelmic peat will be reused within the borrow pits to create the desired profile and this will be surfaced with acrotelmic material (turves) where available or reseeded to the local environment and habitats. This approach encourages rapid vegetation regeneration, preventing desiccation and carbon losses from the peat used in the reinstatement.

5.4.18 The final design will also take into consideration the stability of the emplaced peat materials and include any additional measures i.e. stabilisation, required to ensure there are no residual risks to the environment or human health resulting from peat slides, see Appendix 12.1 for details on the Peat Slide Risk Assessment.

Borrow Pit 1 (BP1)

5.4.19 BP1 will be the first construction activity that will involve peat excavation, as the aggregate quarried from here will be used in the construction for access track (A001 – see Figure 3.1 of the ES). It is expected that BP1 will be restored to a dry heath habitat within the 3-6 months of the construction programme. The average depth

for BP1 is 0.52m with a calculated reinstatement volume 29,580m^3 and a reinstatement depth of 2m. For details of BP1 design, see Figure 3.16.

Borrow Pit 2 (BP2)

5.4.20 Aggregate from BP2 would be required for the construction of turbine foundations and hardstanding areas. BP2 is likely to be restored to a dry heath habitat within the first 12 months of construction. The average depth for BP2 is 1.13m with a calculated reinstatement volume of 69,175m^3 to a depth of 2.5m. For details of BP2 design, see Figure 3.17.

Borrow Pit 3 (BP3)

5.4.21 BP3 is the largest and most central borrow pit of the Proposed Development with an expected reinstatement volume of 81,935m^3 to a depth 3.5m. Depending on the current ground water level of this location, BP3 has the potential to be restored to a wet modified bog within a 24-month period. For details of BP3 design, see Figure 3.18.

Borrow Pit 4 (BP4)

5.4.22 BP4 aggregate is likely to be required within the first months of construction as this location is immediately accessible from the main road. BP4 has an average depth of 0.62m with a calculated reinstatement volume of 35,860m^3 to a depth of 2m. For details of BP4 design, see Figure 3.19.

Compound during construction

5.4.23 Once the Proposed Development is operational, it is expected for the compound location to be reduced in size in order for peat to be reinstated. Catotelm peat will be used to create internal bunds inside of a perimeter fence. The bunds will be approximately 1.5m in height so to protect the reinstated catotelm and acrotelm turfs. This method will encourage the revegetation of the degraded peatland and re-establish a previously higher ground water level.

5.5 Reuse of peat for other Restoration Purposes

Gully / Peat Plugging

5.5.1 The formation of peatland is reliant on a high water table, whether temporary or permanent. The existing erosion features identified across the whole of the Site (Photograph 3), will promote dewatering of up gradient peat. In order to allow peat bog restoration, the lowering of the water table by the erosion gullies must be

reduced to allow the water table to rise, becoming more waterlogged and slowing down decomposition of organic matter, thus creating the wet conditions required for Sphagnum regeneration.

5.5.2 It is assumed that the water table can be restored in the gully areas via blocking using peat supported by dam structures.

5.5.3 A detailed gully blocking and reinstatement method statement will be agreed with SNH and SEPA prior to the commencement of construction, sub-divided into the indicative hydrological catchments. The details will be contained within the PRMP.

5.5.4 It has been calculated that 1.7ha using a reinstatement volume of 25,500m^3 will be infilled using best practice methods to be specified from a detailed topographic and hydrological survey. There are a number of constraints that must be taken into account when selecting the dam material which include slope, drain size and exposure of mineral substrate. It is proposed to use peat turves and fibrous material for ditch blocking. Peat turves will be placed over the top of dams to promote regrowth of vegetation. No amorphous catotelm will be sued for ditch blocking. Some catotelm could be used in deeper furrows, unless otherwise specified by the ECoW.

Photograph 3: Eroded hags and gullies present across the site and suitable for infilling